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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide"

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conferences.

On Wednesday, March 28th, the Northern Yorke Peninsula Branches of the Agricultural Bureau will meet in conference at Kadina. Sessions will be held in the morning and afternoon.

This gathering will be followed by the conference of South-Eastern Branches, which is being held this year at Bordertown, on Wednesday, April 4th.

At both gatherings, which, as usual, will be open to the public, addresses will be given by officers of the Department of Agriculture, papers read by members of the local Branches, and subjects of topical interest will be discussed.

Ground Wheat versus Whole Wheat for Fattening Pigs.

Forty spring pigs, divided into four lots of 10 each, were used in experiments conducted by the Department of Animal Husbandry of the Experimental Station at Lincoln for the purpose of determining the relative feeding values of whole wheat and ground wheat when fed to fattening pigs. To the first lot of 10, soaked whole wheat was fed; to the second, soaked whole wheat 19 parts, tankage (slaughter-house refuse) 1 part. Lot 3 received soaked ground wheat, and lot 4 soaked ground wheat 19 parts, and tankage 1 part.

The facts arrived at were that when wheat comprised the entire feed for fattening pigs, (1) 3lbs. of soaked ground wheat produced as much gain as 4lbs. soaked whole wheat; (2) ground wheat produced gains 42 per cent. faster than whole wheat; (3) a noticeable amount of wheat passed through the pigs undigested. When a mixture of 19 parts of wheat and 1 part tankage comprised the entire feeding for fattening pigs, (1) 6lbs. ground wheat produced practically as much gain as 7lbs. of whole wheat; (2) ground wheat produced gains 21 per cent. faster than whole wheat; (3) the whole wheat was apparently better digested when fed with tankage than fed without tankage. Ground wheat proved more profitable than whole wheat for fattening pigs, either when fed with or without tankage.

These facts, says the *International Review of the Science and Practice of Agriculture*, lead to the following conclusions:—A great saving can be effected by grinding the wheat for fattening pigs; pigs can be fattened and marketed on a shorter feed with the ground wheat than with the whole wheat; owing to the faster gains made and the better finish obtained, small amounts of tankage can be profitably fed with ground wheat. In case grinding the wheat is not practicable, a small amount of tankage fed with whole wheat will materially increase the rate of gain, and, on the basis of the prices adopted, will materially increase the profit obtained.

Paralysis.

From time to time, especially after harvest, inquiries come in as to the cause and treatment of a form of paralysis which attacks horses, generally several in a stable, and most often blacks, browns, and greys of 2 to 7 years. The disease has been called by fearful names, such as cerebro-spinal meningitis, toxæmic paralysis, and so forth. The causes are not scientifically investigated, says the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.), but observation shows that a combination of circumstances is required which fortunately seldom occur together. These are, a stage in the development of worms of the bloodworm kind which produce a poison capable of causing paralysis; change in the digestibility of food, such as new chaff and wheat; the growth of moulds, many nearly related to smut and rust; hard continuous work such as harvest involves; exposure to heat or cold; the inoculation of minute parasites by biting flies, which are fond of breeding in scrub and mature about hay harvest. The symptoms are well known, loss of power of the hind quarters, spreading over the body, including the tongue and throat, preceded by constipation, but the urine is generally freely—perhaps too freely—passed. Treatment should commence by clearing the bowels by aloes and enemas, slinging early, a tablespoonful of Fowler's solution of arsenic and a teaspoonful of sulphate of quinine two or three times a day, mustard and liniment along the spine, and hand rubbing the limbs frequently. If qualified veterinary aid is available it should be obtained early, or the chance of recovery is materially lessened.

Dipping Sheep: A Warning to Flockowners.

At the last meeting of the Advisory Board of Agriculture the Chief Inspector of Stock (Mr. T. H. Williams) again directed attention to the necessity for owners of sheep dipping the animals in poisonous powder dips. Some owners were still using non-poisonous carbolic dips, he said, and only recently a case had come under his notice in which a flock had been treated with a non-poisonous preparation, and three weeks after dipping the animals were showing signs of tick and lice infection. His attention had been directed to instances in which agents for non-poisonous dips had misled purchasers into believing that they were complying with the requirements of the Stock Diseases Act by using these dips. Legislation required sheepowners to use poisonous powder dips, and anything else was useless.

Imports and Exports of Fruits, Plants, Etc.

During the month of December, 1916, 4,619bush. of fresh fruits, 3,722bush. of bananas, 604 bags of potatoes, 96 bags of onions, 4pkgs. of other vegetables, 31pkgs. of plants, seeds, and bulbs, 662 empty casks, and 116 empty cases, and 18pkgs. bags were examined and admitted at Adelaide and Port Adelaide under the "Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910." One hundred and two bushels of bananas were destroyed, being overripe, and 18pkgs. empty bags fumigated. Under the Federal Commerce Act, 3,381

pkgs. of dried fruit and 200pkgs. preserved fruit were exported to oversea markets. These were consigned as follows:—For New Zealand, 180pkgs. of dried fruit and 200pkgs. of preserved fruit; for London, 1,201pkgs. dried fruit; for Vancouver, 2,000pkgs. of dried fruit. Under the Federal Quarantine Act 4,813pkgs. of seeds, plants and bulbs, etc., were examined and admitted from oversea sources.

During the month of January, 1917, 269bush. of fresh fruits, 10,410bush. of bananas. 20 bags of potatoes, 23pkgs. of other vegetables, and 2,068 empty wine casks were examined and admitted at Adelaide and Port Adelaide under the "Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910"; 410bush. of bananas were destroyed, being overripe, and 298 empty wine casks fumigated. Under the Federal Commerce Act 627pkgs. of dried fruits were exported to oversea markets. These were consigned as follows:—For New Zealand, 260pkgs. dried fruits; for London, 367pkgs. of dried fruits. Under the Federal Quarantine Act, 874pkgs. of seeds, fruits, plants, bulbs, etc., were examined and admitted from oversea sources. Of these 4 bags of Fenugreek seed were cleaned on account of the presence of proclaimed weed pests, etc.

PLUMS.

With the object of securing a continuous supply of fruit throughout the season, a correspondent has sought information respecting varieties to plant. The following list, supplied by the Horticultural Instructor (Mr. Geo. Quinn) may be taken as an approximate succession of plums, principally for use for dessert and jam making:—

(B) Rivers' Early Prolific	(W) Washington
(J) Wright's Early	(BD) President
(J) Formosa	(WD) Jefferson
(B) Clyman	(B) Prince Englebert
(B) Hill End	(J) Satsuma
(B) Early New Orleans	(J) October Purple
(J) Burbank	(BD) Prune D'Agen
(BD) Angelina Burdett	(B) Grand Duke
(J) Wickson	(WD) Reine Claude de Bay
(WD) Greengage	(WD) Golden Drop (Coe's)
(BD) Sugar Prune	(J) Kelsey
(B) Blue Diamond	

(W) white to yellow, (D) drying sorts, (B) blue to purple, (J) Japanese.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

[Extraordinary pressure on space has rendered it necessary to very considerably curtail the inquiry department. Replies to those questions of more general interest only have been published; however, every query received has been replied to through the post.—Ed.]

"N. G. Z.," Lyndoch, has a horse, timid, loses condition in cold weather, and rubs tail.

Reply—The symptoms point to worms, especially the whip worms or *Oxyuris equus*. Prepare for physic by feeding on bran only for two days, then give a five dram physic ball, obtainable from a chemist. When this has ceased to scour put on ordinary feed, and twice a day for a fortnight give in feed a flat tablespoon of a powder made by mixing $\frac{1}{2}$ lb. each of sulphate of iron, sulphur, saltpetre, gentian, and $\frac{1}{2}$ lb. each of sugar and linseed meal.

"R. L. M.," Mount Hope, had mare, three years, which for first six hours was uneasy, striking belly, lying down and partly rolling; second six hours, similar, but putting nose in flank and turning up lip; third six hours, apparently much better, walking about, eating and drinking; fourth six hours, worse, sweating, excited, udder swollen, short, quick breathing, constantly lying, throwing head about and dying. Broken in, but not worked for a fortnight. Lump at navel from birth. Diet, heads from winnower tipped on hard ground, oaten chaff slightly musty. *Post Mortem*—Small bowels distended with wind, inflamed; blind bowel fairly normal, large colon inflamed, with little sand and dirt. Thousands of small white worms, about $\frac{1}{4}$ in. long, a few longer.

Reply—As suspected, the illness and death were due to colic, inflammation of the bowels. The symptoms, well described, show that injudicious feeding combined with a rupture (navel lump) and bloodworms, the long ones *Sci. equinum*, the short *Sci. tetracanthum*, which bore through the bowels and inoculate the system with poisons formed from moulds in the fodder, all combined to bring about fatal results. Full details of treatment may be found in Bulletin "The Horse," obtainable from the Editor for a penny stamp for postage. Another valuable bulletin is one by the Director of Agriculture dealing with substitutional feeding during the drought, which would show the insufficiency of the diet given, even if it were of good quality.

"S. H.," Spalding, has a mare, udder enlarged slightly, and wax on teats which gave milk. She has not been to horse as far as is known.

Reply—Occasionally there is what is called false gestation, when the symptoms mentioned occur without service, but it is more likely that the mare has stolen to horse and slipped the embryo. Treatment is unnecessary, but should she seem out of sorts an ounce of photographer's hypo. once a day for three days will probably put her right.

"J. L. D.," Milang, reports sheep found dead without a struggle, quickly blow up and mortify, blood under skin.

Reply—The symptoms are compatible with eating the weed sent, *Solanum nigrum*, or black nightshade, first cousin to the deadly nightshade. All the plants of this family, including the potato, have poisonous properties which are active at one season and not at another. The symptoms may also point to a blood infection whereby the red cells are broken down. It would be necessary to make a microscopic examination for this, and should more die, if you will send a piece of the fourth stomach with a few inches of bowel attached, and a pickle bottle of dung as passed, this would be examined. Treatment—Cooper's worm tablets.

"F. G. R.," Wepowie, has a foal five months, lame, bottom of hoof swelled, and walks on toes.

Reply—There is laminitis, due to some constitutional disturbance, and the frogs are most affected. Dress these daily with lemon juice, and give five drops tincture aconite twice a day for a week. If there should be breaking out at the hoof head, dress this with lemon juice also. If the foal is still on the mare, give her once daily for a week, an ounce of photographers' hypo.

"F. C.," Spalding, has a mare which foaled twins, did not clean properly, and is dull and out of sorts.

Reply—Give tincture pulsatilla, 10 drops, three times a day for three days and then tincture arsenicum twice a day for a week. If symptoms of fever in the feet set in keep cold swabs on them. Bran and green feed only for a time.

"W. D.," Millicent, has a stallion, 10 years, very stiff, as if foundered, but has had no corn; has a bag of sow thistles a day with bran and chaff, groans when down, will not get up; hoofs hot, eats well, and looks well.

Reply—This is a case of founder; grain is not necessary to cause it, possibly in this case want of exercise. It is even possible that certain components of the sow thistles have contributed to it (glucosides). Treatment—Bleed three quarts at neck vein, keep cold swabs on feet, force to walk a little at least twice a day. Give 20 drops of tincture arsenicum and tincture aconite alternately every four hours for a week. Do not overfeed.

"G. E.," Meadows South, states that young white pigs are rubbing sores on rila.

Reply—As no vermin can be found it is possible that sun scald is the trouble; this is a kind of eczema. Lightly swab the pigs every now and again with veterinary vaseline or raw linseed oil, or better, give them a rubbing post made by tying a few bags round a post such as the entrance to their sleeping place and soaking them with oil occasionally so that the pigs can rub when they like. Spray occasionally with sheep dip as before. Mix equal parts of sulphur, saltpetre and charcoal, and give each a tablespoon in food daily. Also feed cinders regularly, or allow a box to be kept in the sty.

"J. M.," Riverton, has a cow with large hard udder.

Reply—It would appear that there is chronic congestion of the udder, and the milk should not be used, unless boiled for at least 15 minutes—it would be better not to use it at all. Foment the udder well with hot soapsuds after each milking, and well rub in some strong mercurial ointment.

"A. C. M.," Joanna, reports case of a mare which had dead foal in October, since got fat, but throws leg out at trot; discharges when driven.

Reply—There is evidently damage to the pelvis during birth, which will probably gradually get better. The discharge when driven points to injury of the passage, but she may be driven without further harm. Give her 10 drops tincture aconite each morning and 10 drops tincture arnica each evening for three weeks, also syringe her out with warm water in which a teaspoonful to the pint of baking soda has been dissolved, this may be done once a week before driving.

"S. H. S.," Naracoorte, has a sow paralysed behind.

Reply—The most common cause is worms, and it would be well to give in a little honey or molasses which she will lick off a stick three times a day, 10 drops tincture nuxvomica, also to rub the loins with liniment daily; also to give twice daily in feed a dessertspoon of a mixture made of equal parts saltpetre, sulphur and charcoal. Give this for a fortnight or so. This in smaller doses, say a teaspoonful, should be a preventive in the case of the younger one.

"J. A.," Dowlingville, had a bay gelding, 17, which went off feed and was drowsy, moped about and kept on looking at his flank, stamped about and could not pass water easily, this was dark in color; dung slimy and bad smell. He hung about for some time till he one day broke out in a sweat all over; could not rise above his knees, and died. Two years ago a similar case occurred accompanied by cough. The feed had a musty smell.

Reply—The symptoms point to that form of poisoning which seems to arise from the poisons made by blood worms combining with those from musty fodder. The disease gets different names, according to each investigator's fancy, but the treatment is to avoid musty fodder, to clear out bowels at onset by a physic ball, and then to give tincture nux vomica in doses suited to age three times a day, and if possible feed only on green feed and oats.

"J. K. B.," Bordertown, states that pigs were found lying stretched out and dead, only milk in paunch, i.e., stomach; no inflammation. White pig, nine weeks, dead, and purplish pink; food in stomach well chewed, and no inflammation, but in large bowel little blood spots and chocolate-colored pasty contents; another one going same way as first.

Reply—The symptoms point to swine erysipelas, which is a form of blood poison, and is often associated with lice. Spray the pigs over with sheep dip or scrub them with same, also sties before they go into them. Keep them off both barley, stubble and mangolds, as these may be partly responsible for the trouble. Let them have a teaspoonful twice daily of a mixture of equal parts sulphur, saltpetre, and charcoal.

"P. A. G.," Spalding, has black gelding, 9 years, and grey mare, 8 years, affected with paralysis.

Reply—This form of paralysis is much more common in blacks and greys than any other color. It has been called by many names, but seems to be due to a combination of poisons formed by worms and fodder acting together. The treatment of purgatives followed by nux vomica, is most likely to do good when recovery does take place, but it would be well to give the mare two tablepoons of Fowler's solution of arsenic daily and a teaspoonful of sulphate of quinine smeared on the teeth twice a day till power is regained, then once. Owing to paralysis of the throat there is great danger in drenching. If food is at all mouldy or musty it must not be given.

"J. P. S.," Riverton, has a bull with ulceration of eye.

Reply—It is to be feared that the bull will be permanently blind, but relief will be found by dropping into the eye daily a few drops of a solution of 2 grains to the ounce of nitrate of silver. If he is not quiet, and a daily dressing cannot be managed a few drops of tincture euphrasia in a teaspoon of water may be squirted in when opportunity offers, say once a week.

"P. T. M.," Mundoora, reports that a gelding, four years, was kicked; was very lame for a few days; not now lame, but very stiff; stretches neck, and eyes are drawn into head.

Reply—The symptoms, especially the eyes, suggest tetanus, and it may go kindly with him. Put him in a comfortable shed and feed on bran and long green stuff such as lucerne, wet the bran well, and put a couple of packets of Epsom salts in each feed for a week or longer if necessary. Keep him quiet, and do not worry with drenches or anything like that.

VETCHES.

"Spring" vetch and "Winter" vetch are varieties of the principal cultivated species of vetch (*Vicia sativa*). The distinction between the two is like that of "winter" wheat and "spring" wheat, the former needing a long growing period, and the latter a considerably shorter one. "Winter" vetch should be sown in the autumn as soon as conditions are favorable, whereas the "spring" variety need not be sown until July, or even early August.—W. J. SPAFFORD (Superintendent of Experiments) in reply to a correspondent.

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1915-16.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

MOORAK.

(Conducted by Mr. A. A. KILSBY.)

During the year arrangements were made, through the Mount Gambier Branch of the Agricultural Bureau, with Mr. Kilsby, to conduct experiments on the rich volcanic soil of the Moorak Estate. For the purpose 10 acres of land were fenced off into two blocks of 5 acres each, the blocks to carry potatoes in alternate years and cereals in the other years. Block A was ploughed in July, and the land prepared for the potato plots, which were divided into tests with varieties and manurial tests with "Snowflake" potatoes.

VARIETY TESTS WITH POTATOES.

On October 12th the planting of varieties was commenced, the sets being planted without manure in rows 30in. apart, and with 28in. spaces in the rows, at a depth of 4½in. Immediately after planting was completed 10cwt. of lime per acre was broadcasted on the surface and harrowed in. The returns from the varieties were as follows:—

Variety Tests with Potatoes.—Moorak, 1915-1916.

Variety.	Yield per Acre.		
	Tons.	Cwts.	lbs.
Scottish Triumph	4	16	37
Coronation Blue	4	3	67
Pinkeyes	4	2	71
Red Skins	4	2	0
Up to date	3	17	76
Snowflakes	3	14	108
Excelsior	3	9	58
Early Manistee	3	8	10
Beauty of Hebron	3	4	0
Brownell's Superior	3	0	5
Peach Bloom	2	18	41
Carmen No. 2	2	3	5
Sussex Red	1	18	41

Mr. Alcock, who attends to the plots conducted by farmers in the South-East, gives the following brief descriptions of the above varieties:—

Redskins.—Mid-season, hardy, strong grower, good keeper, producing tubers of good average size with reddish skin.

Coronation Blue.—Mid-season, hardy, spindly growth, good croppers, excellent keepers, producing smooth-skinned oval tubers of a bluish color.

Pinkeyes.—Early, excellent croppers, producing round tubers with white skins and deep eyes.

Scottish Triumph.—Late, excellent croppers, good keepers, producing smooth tubers with white skins and shallow eyes.

Up-to-Date.—Mid-season, hardy, strong growth, good croppers, good keepers, producing good average-sized tubers with white skins.

Snowflakes.—Very late, hardy, strong growth, excellent croppers, excellent keepers, producing large-sized, irregular-shaped tubers with white skins.

Excelsior.—Mid-season, hardy, good croppers, producing light-colored, red-skinned tubers with deep eyes.

Early Manistee.—Early, hardy, good croppers, good keepers, producing flat, oval tubers with smooth brownish skins. Rapid maturing variety.

Beauty of Hebron.—Late, tall, erect growth, fair croppers, poor keepers, producing long, white-skinned tubers with a pink tinge.

Brownell's Superior.—Mid-season, hardy, robust growth, poor keepers, producing tubers of good average size with dark-reddish skins, resembling *Redskins* in shape and color.

Peach Bloom.—Seed supplied was of a late, poor-cropping variety, not similar to the local variety of this name.

Sussex Red.—Mid-season, fair growth, poor croppers, good keepers, producing round tubers with light-reddish, smooth skins and deep eyes, resembling *Excelsior*.

Carmen No. 2.—Early, fair growth, good keepers, producing regular shaped tubers with white skins.

MANURIAL TEST WITH POTATOES.

The land for the manurial tests was prepared at the same time as that for the varieties. Planting was started as soon as the varieties were finished, and *Snowflake* potatoes were used on all plots, the manures in all cases except plot 10 being put in the same plough furrow as the sets.

*Manurial Plots with Potatoes.—Moorak, 1915-1916.**Snowflakes on all Plots.*

Plot.	Manuring per Acre.	Yield per Acre.		
		Tons.	Cwts.	lbs.
1.	1ewt. sulphate of potash	3	1	65
2.	1½ewts. sulphate of potash	3	5	10
3.	2ewts. sulphate of potash	3	10	24
4.	5ewts. basic slag and 1ewt. sulphate of potash	3	12	47
5.	5ewts. superphosphate and 1ewt. sulphate of potash	3	9	35
6.	5ewts. super., 1ewt. sulphate of potash, 2ewt. nitrate of soda	3	7	52
7.	6ewts. lime and 1ewt. sulphate of potash	3	14	49
8.	No manure	3	12	7
9.	6ewts. lime and 5ewts. superphosphate	3	12	46
10.	6ewts. lime and 5ewts. superphosphate (super. drilled in on the surface	3	13	45
11.	6ewts. gypsum and 5ewts. basic slag	3	15	33
12.	6ewts. gypsum, 5ewts. basic slag, 2ewts. sulphate of ammonia	3	3	61

The yields of potatoes—both in manurial plots and variety tests—is very much lower than was expected, and cannot be a criterion of how the various plots will behave on the average, because the potato-growing season was extraordinary for the district. November gave only a little over an inch of rain; December was practically rainless, with only 4 points; January recovered things to some extent with 187 points; but both February and March were low, particularly the latter month, with 71 and 35 points respectively.

VARIETY TESTS WITH OATS AND BARLEY.

After the potatoes were removed from the block, it was ploughed up in July, and on August 8th varieties of oats and barleys introduced from New Zealand were drilled in. These varieties were sown at right angles to the potato manurial plots, so that each variety had access to the same proportion of the various residues of the manures used on the potatoes. No manure was used with the cereal plots.

Variety Tests with Oats.—Moorak, 1916.

Variety.	Grain per Acre.	
	Bush.	lbs.
Garton's Abundance	39	0
Liggowo	29	39
Webb's Challenge	26	38
Garton's Record	25	34
Ruskura	22	33
Garton's Leader	22	16
Garton's Yields	21	16
Dun	19	0
Black Scotch	16	23
Sparrowbill	16	16
Long Tartarian	14	27
Banner	10	17
Algerian	6	16
Danish		Failure.

Mr. Alecock reports on these varieties as follows:—"All plots germinated well, and by the end of August were well through the ground, and looked well. Tartarian was affected by frost. The subsequent growth of most of the plots was strong and rank, all varieties making excellent headway. The yields were all more or less affected by the presence of cutworms, which continued their depredations even after the crops were cut and stooked. 'Danish' was a complete failure, and Algerian nearly so, owing to the attacks of these cutworms."

During the spring patches in practically all of the plots showed some affection that looked to be the result of a fungus disease. Samples were submitted to the Professor of Botany at the Adelaide University (Professor T. G. B. Osborn), who states:—"On the faded yellow spots on the leaves there has developed fairly constantly a *cladosporium*, but I fear the cause of the disease symptoms is obscure, though probably the *cladosporium* is concerned with it. Probably, normally, the amount of damage done would be slight, and the unusual weather this season may be a most important factor in contributing to the increased damage observed by you."

This trouble materially reduced the yields from some of the varieties, as before the warm weather set in the affected patches were rotting down. On the approach of summer the patches partly recovered, but the trouble left its mark.

The following brief descriptions of the varieties of oats were supplied by Mr. Alecock:—

Garton's Abundance.—Growth very tall and very coarse, foliage broad and dark green, well headed, grain large, plump, and white, ripening nearly three weeks later than Algerian. Affected by both rust and smut.

Liggowo.—Growth very tall and very coarse, foliage broad and dark green, resembles Abundance, but was less affected by rust, and stands up better, grain plump and white, ripening nearly three weeks later than Algerian.

Webb's Challenge.—Growth short and fine, good dark color, good stooler, makes very slow growth, well headed, grain long, narrow, and dark brown or black, very late.

Garton's Record.—Growth strong and coarse, foliage broad and dark green, grain large, plump, and white, ripening quite three weeks later than Algerian. More or less affected by rust.

Ruakura.—Growth rapid, fine and short, foliage good color, good stooler, well headed, grain medium sized, slate colored, early, badly affected by *cladosporium*.

Garton's Leader.—Growth not as coarse as other Gartons, but more erect, foliage lighter color, grain large, plump, and white, some rust.

Garton's Yields.—Growth tall and coarse, straw robust, foliage broad and dark-green color, well headed, grain large, plump, and white, ripening about a fortnight later than Algerian, rust on leaves and straw.

Dun.—Growth short and fine, foliage dark green, makes slow growth, good stooler, well headed, grain small and slate colored, very late, badly affected by cladosporium.

Black Scotch.—Growth short, fine and erect, foliage dark green, grain medium sized and black or dark brown, very late.

Sparrowbill.—Growth strong and vigorous, went down badly in patches, foliage dark green, well headed, grain short, plump, and white.

Long Tartarian.—Growth erect and fairly coarse, foliage lighter color than most varieties, grain long, narrow, and white, ripening late. Frosted badly, only producing grain on one side of the heads.

Banner.—Growth strong, erect, and coarse, foliage very broad and dark-green color, well headed, grain medium sized and white, ripening later than Liggowo.

Algerian.—Growth of medium height and fairly fine, foliage lighter than most varieties, fair stooler, grain medium size of amber color.

Danish.—Growth and general appearance resembling Algerian, but ripening much later, grain short, plump, and yellowish.

Variety Tests with Barleys.—Moorak, 1916.

Variety.	Grain per Acre.	
	Bush.	lbs.
Gisborne	39	0
Wind Resisting	36	2
Kinver's Chevalier	24	17
Archer's Chevalier	20	34

The Chevalier barleys made good growth, but did not fill like the other two, and they were more affected by cutworms than were the latter.

Mr. Alcock sends the following descriptions of the above barleys:—

Gisborne.—Growth strong and even throughout, foliage good healthy color, good stooler, well headed, heads like Duckbill, grain well filled and with fine husk.

Wind Resisting.—Growth medium height and erect, foliage dark-green color, good stooler, well headed, heads resemble Duckbill, grain very fair.

Kinver's Chevalier.—Growth medium height, but straw weak and easily lodged, good stooler, well headed, heads very long, grain large and coarse.

Archer's Chevalier.—Growth medium height, but straw weak and easily lodged, foliage dark green, good stooler, heads very long, grain good light color and not too coarse.

In the conducting of these plots, and particularly the potato experiments, Mr. R. Fowler, the Inspector of Fruit, &c., stationed at Mount Gambier, has given us very valuable help, both in the actual work connected with them, and with the very best of advice.

EXPERIMENTS WITH THE MANURING OF WHEAT AT SADDLEWORTH.

(Conducted by Mr. F. COLEMAN.)

In 1905 Mr. Coleman started a series of permanent manuring plots with wheat, and for the 12 years since that time these plots, testing the effects of various manures on the yield of wheat grown on bare fallow, have been carefully conducted by him. For the purpose Mr. Coleman has set aside a field, one half of which is bare fallowed every year, the other half carrying the wheat crops. Each half is permanently pegged into plots, ensuring that each time the plots are cropped they occupy exactly the same space. Each plot receives exactly the same manuring every time that it is in crop, so that the longer these experiments are continued the greater will be their value. A report on the results of these plots, together with Mr. Coleman's remarks on them, has been published each year. For 1916 plots, Mr. Coleman says:—"The plots suffered from too much wet, which appeared to check the wheat, but allowed wild oats, &c., to grow. Milk thistles are becoming a trouble in the plots. The northern side of plot 1 was affected by the rubbish growing along the fence, whilst on the other hand the best piece in the plots was on the south side of plot 8, against the fallowed piece to be sown this year. These differences are corrected each year, as plot 1 comes alongside fallow this year, and plot 8 alongside a fence where rubbish can grow. Federation wheat was sown at the rate of 74lbs to the acre on all plots on July 5th."

TABLE 1.—Showing Yields for 12 Years of Manurial Plots at Saddleworth.
Each Plot Half-Acre in Area.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
	1 cwt. Mineral Super. per Acre.	1 cwt. Mineral Super., 2 cwt. Nitrate of Soda per Acre.	1 cwt. Mineral Super., 1 cwt. Sulphate of Potash, 1 cwt. Nitrate of Soda per Acre.	1 cwt. Bone Super. per Acre.	No Manure.	1 cwt. Mineral Super., 1 cwt. Sulphate of Potash per Acre.	1 cwt. Sulphate of Potash and 1 cwt. Nitrate of Soda per Acre. 2 cwt. Mineral Super. for last 5 years	1 cwt. Mineral Super., 1 cwt. Nitrate of Soda per Acre.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
1905.....	31 0	29 22	33 48	34 36	29 50	35 6	30 38	33 10
1906.....	32 20	34 10	32 22	33 56	23 40	33 34	24 42	36 8
1907.....	35 42	38 2	39 8	36 22	24 52	35 32	25 16	35 50
1908.....	17 28	19 28	20 52	17 34	7 36	19 36	8 50	18 52
1909.....	31 42	32 54	35 6	30 40	24 32	29 34	23 18	33 34
1910.....	21 4	22 26	25 20	26 24	15 12	28 34	15 28	29 38
1911.....	21 54	24 0	24 40	24 44	15 30	24 6	15 34	20 40
1912.....	23 34	27 22	27 50	28 56	12 58	25 14	29 36	23 58
1913.....	26 22	26 36	25 14	24 36	4 56	22 44	21 10	20 34
1914.....	7 34	11 54	10 46	12 0	5 56	10 56	12 34	11 44
1915.....	22 46	18 48	25 26	19 34	1 36	20 54	13 38	21 46
1916.....	13 22	17 32	19 6	17 54	15 32	15 46	19 46	21 16
Mean for 12 years ..	23 45	25 18	26 38	25 36	15 11	25 13	19 21 *6 years.	25 36

*Plot 7, from 1905 to 1911 inclusive, received $\frac{1}{2}$ cwt. sulphate of potash and $\frac{1}{2}$ cwt. nitrate of soda per acre.

TABLE 2.—Showing Increased Yield of Manured Plots over Unmanured Plot
in 1916.

Plot 1	Plot 2.	Plot 3	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
Bus. lbs. —2 10	Bus. lbs. 2 0	Bus. lbs. 3 34	Bus. lbs. 2 22	No manure	Bus. lbs. 0 14	Bus. lbs. 4 14	Bus. lbs. 5 44

TABLE 3.—*Showing Value of Increased Yield of Manured Plots over Unmanured Plot in 1916.*

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7.	Plot 8.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value of increase at 3s. 5d. per bushel.	0 7 5	0 6 10	0 12 2	0 8 1	0 0 10	0 14 5	0 19 7
Cost of Manure...	0 4 0	0 9 10	0 18 0	0 5 6	0 11 0	0 8 0	0 11 0
Net value of incse.	£-0 11 5	£-0 3 0	£-0 5 10	£0 2 7	£-0 10 2	£0 6 5	£0 8 7

Value of various manures taken as:—Mineral superphosphate, £4 a ton; bone superphosphate, £5 10s. a ton; sulphate of potash, £14 a ton; nitrate of soda, £14 a ton. These manure values are obviously incorrect for 1916—in fact, sulphate of potash cost £26 a ton, but this is a fictitious price due to the war. Should the price of these fertilisers keep high, it will be necessary in the near future to alter the values so that they approach the average.

TABLE 4.—*Showing Increased Yield of Manured Plots over Unmanured Plot for the period 1905 to 1916 (12 Years); together with Net Value of Increase and Average Annual Increase.*

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7. 5 years.	Plot 8.
	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.
Increased yield for 12 years	102 48	120 24	137 28	125 6	120 26	55 46	125 0
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value at 3s. 5d. per bushel	17 11 3	20 11 4	23 9 8	21 7 5	20 11 6	9 10 6	21 7 1
Cost of manure	2 8 0	5 18 0	10 16 0	3 6 0	6 12 0	2 0 0	6 12 0
Net value of increase	15 3 3	14 13 4	12 13 8	18 1 5	13 19 6	7 10 6	14 15 1
Average annual value of increase	1 5 3	1 4 5	1 1 2	1 10 1	1 3 3	1 10 1	1 4 7

1.—EYRE'S PENINSULA EXPERIMENTAL FARM.

(Manager—Mr. L. J. Cook.)

This farm consists of 3,041 acres, comprised of the sections 26, 27, and 28, in the hundred of Minnipa, situated 158 miles north of Port Lincoln. It is fairly centrally situated, as concerns the whole of Eyre's Peninsula, and is the point from which departmental activities in agricultural matters on that vast stretch of arable land will proceed. It should serve to advertise the possibilities of this practically

unknown country, and should hasten the day when up-to-date farming methods are the recognised practice of that part of the State. The whole of the farm is gently undulating, and practically the lot of it can be put under cultivation. The above-mentioned sections were dedicated a reserve for agricultural purposes in November, 1914, and a manager was appointed on January 1st, 1915, who commenced operations in that month.

THE SEASON 1916.

The year opened with 80 points of rain in January, but with very little in both February and March; but the rainfall in the first three months of the year plays but little part in wheat growing, other than germinating weeds on the fallowed land, and so giving a chance to clean it.

April only gave 27 points of rain, which is very low for this month in an "early district," for during this month the land should at least be prepared for seeding, and some of it should be sown. Over 1in. was registered in May, and both June and July each gave over 3½in. These rains permitted a proper seeding of crops, although it was late. In each of the spring months—August to October—good falls were registered, and they totalled 6.80in. for the period. November also gave a good fall, registering a little over an inch, and in December 0.12in. fell, which was quite enough for the season. We only have records at this farm for one other season, and the following table shows in detail the rainfall for the two years:—

Rainfall Distribution at Minnipa, 1915-1916.

	1915. Inches.	1916. Inches.	Means. 1915-1916. Inches.
January	0.74	0.80	0.77
February	0.09	0.01	0.06
March	0.02	0.44	0.23
April	1.18	0.27	0.72
May	2.03	1.23	1.63
June	1.88	3.67	2.77
July	2.54	3.60	3.07
August	3.57	2.55	3.06
September	0.98	2.33	1.65
October	0.41	1.92	1.16
November	—	1.05	0.52
December	0.44	0.12	0.28
Total	13.88	18.02	15.92
Total "useful" rain (April-November)	12.59	16.62	14.58

In this district, which is essentially a low-rainfall district, with soils that are of comparatively light texture, "seeding" rains (April-May), "winter" rains (June-July), and early "spring" rains are essential, and, indeed, are all that are necessary to produce crops of wheat.

During the year the "seeding" rains (April-May) were rather light, only totalling 1.50in.; but these were followed by exceptionally good "winter" rains (June-July), which together showed 7.27in. The "spring" rains (August-October) gave 6.80in., and for the "early summer" rains (November) another 1.05in. were collected. These really good winter, spring, and early summer rains easily counteracted any ill effects from the delayed seeding occasioned by the comparative shortage of "seeding" rains. The table below sets out the distribution of the "useful" rainfall.

Distribution of "Useful" Rainfall in 1916, Comparatively with the Means for 1915-1916.

	1916. Inches.	Means. 1915-1916. Inches.
Seeding rains (April-May)	1.50	2.35
Winter rains (June-July)	7.27	5.84
Spring rains (August-October)	6.80	5.88
Early summer rains (November)	1.05	0.52
Total "useful" rain	16.62	14.59

CROPS.

The farm was only started in January, 1915, and as all land clearing is being done properly, *i.e.*, by removing the roots of all trees growing on it, the cropping area added each year must of necessity be comparatively little. In 1915 there was cropped 148 acres, and as this was the first crop the land had carried, it was decided to recrop it this year. Besides this, 75 acres were grubbed, some of it bare fallowed, and the remainder cropped on autumn cultivation. The cropping consisted only of the cereals wheat and oats, most of the wheat being of selected pure strains of varieties from which first-class seed could be sold.

Hay Crops.—Nothing was sown specially for hay, as we were carrying large stocks from last harvest. Divisions between blocks and some self-sown was all that was cut for the above purpose, and amounted to an area of 2.341 acres, which produced 4 tons of hay for an average of 1 ton 14cwt. 19lbs. per acre.

Hay Returns.—Minnipa, 1915-1916.

Year.	Total Rainfall.	Useful Rainfall.	Area.	Total Yield.	Yield per Acre.
	Inches.	Inches.	Acres.	Tons cwt. lbs.	Tons cwt. lbs.
1915	13.88	12.59	148+0	290 0 0	1 17 94
1916	18.02	16.62	2.34	4 0 0	1 14 19
Means . . .	15.95	14.60	—	—	1 16 0

Oat Crops.—Part of fields Nos. 1 and 3, consisting of land the most of which was in wheat last year, a little in oats, and the remainder new land, to the extent of about 50 acres, was ploughed between February 28th and April 17th for oats. It was harrowed before the end of April, and again after the drill. From May 1st to May 4th 60lbs. Algerian oats and lewt. superphosphate were drilled in to the acre on the whole piece.

These oats when harvested produced 1,987bush. 20lbs. from 49.90 acres, for an average of 39bush. 33lbs. per acre.

Wheat Crops.—No grain was harvested from last year's crop, the whole being cut for hay, so for the present season fresh seed had to be obtained. Most of this new seed consisted of pure-bred selected varieties from Roseworthy Agricultural College. This seed gives us a good start in the production of seed wheat, which is one of the things that can be done with great advantage on Eyre's Peninsula. It is very gratifying that for this, the first year that we could supply good seed from this farm, the demand far exceeded the supply, and every grain fit for seed over and above our own requirements has been sold. The wheat varieties were grown on land in three different states—some on new land fallowed in 1915, some on new land not fallowed, and the remainder on 1915 stubbles. The returns, showing where grown, are to be found in the following table:—

Wheat Variety Yields.—Minnipa, 1916.

Variety.	Field Grown.	Area.	Total Yield.		Yield per Acre.
<i>New land, fallowed 1915—</i>					
		Acres.	Bush.	lbs.	Bush. lbs.
Caliph	No. 2	11.87	427	4	35 59
King's Red	Nos. 1, 2, 3	14.12	495	22	35 5
Queen Fan	No. 2	3.34	115	13	34 20
College Eclipse	No. 2	8.42	280	18	33 17
Means for fallowed land		37.75	1317	57	34 55
<i>New land—</i>					
Gluyas	No. 13	25.28	624	9	24 41
<i>Stubble land—</i>					
Eclipse	Nos. 1, 2	35.78	1059	37	29 37
King's Red	Nos. 1, 2	20.53	583	21	28 25
College Eclipse	No. 2	1.75	49	19	28 11
Baroota Wonder	No. 1	37.98	1048	27	27 36
Queen Fan	No. 2	0.285	7	25	26 1
Gluyas	No. 1	12.37	217	51	17 37
Means for stubble land		108.70	2966	0	27 17
Farm average		171.73	4908	6	28 35

The land carrying the above varieties was cultivated as follows:—
Bare Fallow.—Ploughed from July 28th to August 13th; cultivated October 21st to 25th, and again May 4th to 8th; harrowed January 4th-5th; seed drilled in with lewt. superphosphate to the acre May 12th to 17th, and harrowed straight away.

New Land.—Ploughed from April 27th to 29th; cultivated April 27th-29th, and again from June 3rd to 7th; seed drilled in from June 6th to 8th, and immediately harrowed.

Stubble Land.—Ploughed from February 28th to April 17th; harrowed April 27th to May 12th; oats drilled in with lewt. superphosphate from May 1st to 4th; Baroota Wonder Wheat drilled in with lewt. superphosphate from May 30th to June 3rd. Remainder of land cultivated June 7th to 13th, and drilled in with lewt. superphosphate to the acre from June 10th to 14th. All harrowed after drilling.

EXPERIMENTAL PLOTS.

On new land in field No. 13 a series of manurial plots with Gluyas wheat was conducted. The plots were drilled in from June 6th to 8th with 65lbs. Gluyas wheat to the acre, with the following results:—

Manurial Tests with Gluyas Wheat.—Minnipa, 1916.

Manuring per Acre.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
No manure	3.598	71 45	19 56
lewt. superphosphate	3.539	81 7	22 55
lewt. superphosphate	4.046	97 49	24 11
2cwt. superphosphate	4.418	126 15	28 35

The remainder of this field—making the area 25.28 acres—was sown to Gluyas wheat with lewt. superphosphate per acre, and averaged 25bush. 33lbs. per acre. The whole field was very badly lodged, and the manager of the farm (Mr. L. J. Cook) estimates the loss through this cause to be quite 2 bags to the acre, with the heavier manured plots as proportionately the greatest sufferers

POULTRY.

THE GREAT IMPORTANCE OF DRINKING WATER FOR LAYING HENS.

Investigations made in the Poultry Laboratory, Department of Agriculture, S.A.

[By D. F. LAURIE, Poultry Expert.]

(Weights and measurements determined by C. F. ANDERSON, Assistant.)

During a number of years the egg of the domestic hen has been constantly studied in elucidating many points. Various theories have from time to time gained currency, and in testing these, and in making other investigations, much valuable data is available. The study of

evaporation of the water content of eggs is of commercial importance. Much work in connection with the behaviour of eggs undergoing cold storage has been carried out by this Department. The question of loss of weight is highly important from a commercial standpoint. From a physiological point of view its significance is very great. It requires no great amount of reasoning to understand that in a newly-laid egg the water content is in the precise proportion necessary for the elaboration of a perfect chicken. Consideration of the facts governing enzyme action, and their nature, leads to the inevitable conclusion that loss of moisture means concentration of solutions of salts with grave alterations to, and perhaps destruction of, various cells due to osmosis. Practical experience shows that stale eggs, as a rule, either fail to hatch or produce weaklings. One reads all sorts of statements concerning the proportion of one part of an egg to another, and with the intention of informing poultry breeders as to the facts of the case a series of studies on this point have been completed. It is a noteworthy fact that I have never met a merchant who knew what the percentage of loss on a given number of eggs was represented by the weight of the shell. Yet that is a matter of elementary importance to a keen trader. In the Tables I, II, III, it will be seen that the mean weight of dried shell is 8.7 per cent. of the whole weight of the egg. In trade, either when using eggs for cake-making or in pulping eggs for cold storage or export, the loss on 100 tons of eggs would, with adherent egg white, amount to 11 or 12 tons.

COMPOSITION OF HEN EGGS.

Although the present investigations are not concerned with the analysis of the contents of hen eggs, it is of interest to breeders to know something of the average composition of eggs. (Taken from Simon.)

General Composition of the Yolk.—Water, 47.19 to 51.49 per cent.; solids, total, 48.51 to 42.81 per cent., consisting of—Fats (olein, palmitin, and stearin), 21.30 to 22.84 per cent.; vitellin and other albumins, 15.63 to 15.76; lecithin, 8.43 to 10.72; cholesterol, 0.44 to 1.75; cerebrin, 0.30 to 0.36; mineral salts, 3.33; coloring matters and glucose, 0.553.

General Composition of the White of Eggs. (N.B.—Albumen is a misnomer, strictly speaking, on account of the glucose content.)—Water, 80.00 to 86.68 per cent.; solids, 13.22 to 20.00, consisting of—Albumins, 11.50 to 12.27; extractives, .38 to .77; glucose, .10 to .30; fats and soaps, traces; mineral salts, .30 to .66; lecithins and cholesterol, traces.

The shell consists of an organic matrix similar to keratin (one of the a-proteins) impregnated with lime salts. Of these calcium (lime), and

magnesium carbonates average 97 per cent.; the phosphate of these minerals, about 1 per cent., a trace of iron, and keratin and moisture 2 per cent. Both membranes lining the shell are also composed of keratin.

The data obtained, as shown in tables I., II., III., were from three lots, each of 12 eggs, White Leghorn, Barred Plymouth Rock, and Rhode Island Red. The eggs were laid in the single testing pens at the Government Poultry Station, Parafield. The eggs were laid by pullets undergoing tests for egg production and size of egg. These eggs were selected at random.

As will be seen on reference to the tables the eggs were first of all weighed with great accuracy on a "Becker" balance. They were then boiled for 10 minutes and again weighed to show loss during boiling, and to help breeders to understand that immersion in water does not add to the moisture content of the egg.

As soon as the eggs were cool the shell was carefully stripped and every particle placed on a watch glass and subsequently weighed, air dried. The white was carefully stripped from the hardened yolk but was not weighed. Each yolk was carefully weighed as shown. The weight, by difference, gives the weight of the white, and of moisture lost at time of weighing.

Weight of egg before boiling. In the single testing work at Parafield no pullet is retained for subsequent use as a breeding hen unless her eggs average 20zs. (56.689gr.) and over. Nos. 1, 3, and 4, White Leghorns (Table I.) are shown to be slightly under the standard weight, but several previous weighings of eggs laid by these pullets showed satisfactory results. The numbers are laboratory numbers, and do not refer to the pen numbers in the poultry station breeding records. The shells of all eggs were strong and dense—birds laying eggs with weak shells are discarded. A theory was brought forward some years ago alleging that in a batch of eggs laid by a hen there is always a rise in weight until a maximum is reached, when a gradual decline in weight takes place. It may be of interest to state that after weighing all the eggs laid by some 20 remarkably consistent layers, and during a period of many months, I could find no proof whatever of this ingenious theory.

LACK OF SUFFICIENT DRINKING WATER.

What I did find on numerous occasions was proof of the great importance of a constant supply of cool clean water for the birds. I found that on warm days, unless ample cool water was available, there was a great fall in the weight of the egg laid by each bird so situated.

I gave the composition of the egg to emphasize its water content, and incidentally the importance to the fowl of an ample water supply. The supply must be constant, not intermittent. It is not sufficient to give the birds a full drink at intervals—the water must be available when the birds require it. Ducks, and more especially ducklings, are disastrously affected by want of water, and although the losses among adult fowls and chickens are not so apparent, yet much damage must result. Ducks lose weight rapidly—moisture loss—if deprived of water even for a few hours. Ducklings, if allowed to become thirsty and then to have access to water, are seriously affected and generally die. The brain and nerve centres are affected.

Loss during Boiling.—It will be noted on reference to Table I, White Leghorn eggs, that the loss in this case has no relation to the weight of the egg. The lightest egg, No. 3, lost more weight than the heaviest egg, No. 10. Egg No. 11, which was a fair-sized egg, shows the least loss during boiling. No. 4, a light egg, lost over 4 per cent. As far as could be seen on careful examination of the various shells there was no difference in porosity. The average loss in weight during boiling was 2.723 per cent.

Reference to Table II., Plymouth Rock eggs, shows that the lightest egg, No. 2, lost more moisture than egg No. 11, which is 8 grammes heavier. The loss during boiling averages 2.631 per cent., which is less than in the case of the White Leghorn eggs, Table I. The White Leghorn eggs were all pure white, no tint. The Plymouth Rock and Rhode Island Red eggs were tinted, some deeply. When we inspect Table III., Rhode Island Red eggs, we find a surprising difference, as there the average loss in weight during boiling is only .788, or in the neighborhood of 25 per cent. of the loss in the White Leghorn and Rock eggs. The ratio of the weight of the average shell of the egg of each breed to the total weight of the egg does not throw any light upon this point.

Weight of Yolk.—Here again we are confronted with seeming anomalies. Egg No. 3, White Leghorn, Table I., is the lightest, yet its yolk is 38.124 per cent. of the whole egg, and 8 per cent. (approximately) more than in the case of egg No. 10 weighing $4\frac{1}{2}$ grammes more.

In Table II., Plymouth Rock eggs, we see the yolk of the lightest egg, No. 2, is 33.213 per cent., as against 27.819 per cent. for the heaviest egg, No. 10.

Referring to Table III., Rhode Island Red, it is seen that there is a general proportion in the percentage weight of the yolk to the whole egg.

The Percentage Weights of the Yolk to Whole Egg.—Table I., White Leghorn, average 32.211; Table II., Plymouth Rocks, average 31.706; Table III., Rhode Island Reds, average 31.239.

Weight of Shell.—Table I., White Leghorn. The heaviest egg, No. 10, has the lightest shell, i.e., the percentage weight of shell to the whole egg. Table II., Barred Plymouth Rocks. The lightest egg, No. 2, has a shell which is 9.071 per cent. of the weight of the egg as compared with the heaviest egg, No. 10, of which the shell weighs only 8.991 per cent. Table III., Rhode Island Red, does not show any marked feature. The average percentage weight of the egg shell in Table I., White Leghorn, is 9.013; Table II., Barred Rocks, is 8.478; Table III., Rhode Island Reds, is 8.697. These percentage weights would, at first glance, refute the statements generally current that the shells of Plymouth Rocks and Rhode Island Reds are denser than those of White Leghorns. Here it is a question of weight only—not of porosity.

Weight of Egg White.—As previously stated in the experiments shown in Tables I., II., and III., the coagulated whites were not weighed. The last two columns show, by difference, the weight and weight per cent. of egg white and moisture lost from yolks, shell, and egg white. Here there is close agreement with the original weight of the egg. It proves, I think beyond doubt, that the principal factor in the percentage weight of the various parts of the egg is the moisture held in chemical combination. The moisture content of the yolk is derived from the ovary and its various vessels. The moisture of the egg white, membranes and shell are derived from the secreting glands in the oviduct. There is reason to believe that there is a final addition to the egg white in the uterus portion of the duct, and a pathological condition due to thirst, hot weather, &c., would considerably influence the egg and its parts.

TABLE IV.

After reviewing the data resulting from the compilation of Tables I., II., and III. it was decided to go further into the question, and for that purpose six White Leghorn and six Rhode Island Red eggs from the same source as in Tables I., II., and III. were selected at random. These eggs were carefully measured in their longest and shortest axes. Micrometer callipers were used, and the measurements verified personally.

The coagulated egg whites of all these eggs were carefully weighed, and extreme accuracy was observed. The egg white of the eggs in Tables I., II., and III. were not weighed separately. After boiling they were again weighed. One egg, No. 5, was cracked during the process, and showed a gain of .069 per cent. in weight. The yolks

were lighter than in Tables I., II., and III., as will be seen by the percentage results. The shells were heavier than those in the other tests.

Egg White.—The average weight per cent. of the whole egg is shown to be 54.328. It will be noticed that Nos. 2 and 4 had the heaviest whites and small yolks. The loss in weight, due to moisture, and the column showing the percentage of such loss, do not help in any way to connect evaporation with weight of egg shell.

SUMMARY.

From these four tables it must be concluded that the most accurate measurements and weighings do not afford any data from which a general rule can be derived. From the 48 eggs used in the experiments we have ascertained with extreme accuracy certain important facts, viz. :—

1. The loss in weight during a process of boiling for 10 minutes. It would be interesting to analyse the water in which the eggs were boiled.
2. The weight of the yolk of each egg and the average weight per cent. Probably some of the oils of the yolk are volatile.
3. The weight of the shell of each egg and the percentage of weight of shell to the whole egg.
4. In Table IV. the weight of coagulated egg white is shown, and the percentage of weight of whole egg.

CONCLUSIONS.

In this and other experiments it has been shown that eggs vary in the weights of the various parts. Other experiments made have confirmed the well known fact that the eggs of individual hens vary considerably, not only within short spaces of time, but also to some extent seasonally. The figures showing these facts are recorded, but for consideration of space are not published now.

All the birds concerned in these tests were in excellent health and were scientifically fed. No consideration need be given to the effects of under feeding, either as regards quantities or quality of food. No sane person expects hens to lay profitably under such conditions.

Porous shells mean loss of weight through evaporation, but in these tests the eggs were fresh. For commercial reasons it behoves breeders to lay stress on the importance of strong, hard shells.

The chief conclusion I arrive at is that a constant, available supply of fresh, clean drinking water is not only the factor responsible for limiting many deviations from average weight, but that it is a factor of vital importance in the wellbeing of the future chicken.

It is not sufficient to provide drinking water. It must be readily accessible, ample in supply, and it must be kept cool.

TABLE 1.—WHITE LEGHORN EGGS.
WEIGHTS IN GRAMMES.

No.	Weight Before Boiling.	Weight After Boiling.	Loss in Weight Per Cent.	Weight of Yolk.	Per Cent. Weight of Yolk of Whole Egg.	Weight of Shell.	Per Cent. Weight of Shell of Whole Egg.	Weight by Difference of White and Moisture.	Per Cent. Weight of White and Moisture.
1	56-050	54-475	2-809	17-652	32-404	4-256	7-866	32-538	49-730
2	57-235	55-579	2-893	16-675	30-003	5-030	9-086	33-854	60-911
3	55-510	53-629	2-848	20-560	33-124	4-089	7-582	29-580	54-204
4	55-615	53-305	4-045	16-352	31-073	4-870	9-126	31-913	59-801
5	56-020	54-515	2-738	19-130	35-091	5-270	9-6-7	30-115	55-432
6	57-325	55-740	2-749	17-038	30-562	4-802	8-614	33-909	60-824
7	58-905	57-571	2-264	17-100	29-702	5-050	9-806	34-791	60-432
8	56-705	55-091	2-846	17-027	32-541	5-227	9-488	31-937	57-971
9	57-425	55-905	2-490	17-647	31-516	5-885	10-088	32-363	57-796
10	60-005	58-360	2-741	17-757	30-427	4-760	8-156	35-843	61-417
11	57-405	56-392	1-764	18-869	33-400	5-595	9-922	31-928	56-618
12	58-905	57-435	2-405	18-169	31-034	4-645	9-087	34-621	60-279
Averages.....			2-723		32-211		9-013		58-776

TABLE II.—PLYMOUTH ROCK EGGS.
WEIGHTS IN GRAMMES.

No.	Weight Before Boiling.	Weight After Boiling.	Loss in Weight Per Cent.	Weight of Yolk.	Per Cent. Weight of Yolk of Whole Egg.	Weight of Shell.	Per Cent. Weight of Shell of Whole Egg.	Weight by Difference of White and Moisture.	Per Cent. Weight of Whole Egg of White and Moisture.
1	58-305	56-830	2-629	20-350	35-809	4-947	8-705	31-533	55-486
2	55-310	53-765	2-793	17-857	33-213	4-877	9-071	31-031	57-716
3	62-905	61-340	2-487	18-882	30-782	5-570	9-081	36-888	60-137
4	57-325	55-970	2-363	18-177	32-477	4-330	7-718	33-473	59-805
5	57-810	55-205	2-766	16-280	28-965	4-420	7-864	35-505	63-171
6	58-365	57-027	2-262	17-030	31-476	5-469	9-591	33-608	58-933
7	59-600	58-227	2-303	18-205	31-206	5-169	8-877	34-853	59-857
8	60-50	58-865	3-278	20-615	34-008	4-609	7-661	34-331	58-331
9	61-937	60-415	2-477	18-720	30-986	4-307	7-129	37-388	61-885
10	66-180	64-200	2-991	17-860	27-819	5-772	8-901	40-568	63-190
11	63-832	62-200	2-556	19-077	30-071	5-949	9-564	37-174	59-765
12	58-050	56-450	2-756	18-629	33-001	4-225	7-484	33-606	59-515
Averages.....			2-634		31-706		8-478		60-816

TABLE III.—RHODE ISLAND RED EGGS.
WEIGHTS IN GRAMMES.

No.	Weight Before Boiling.	Weight After Boiling.	Loss in Weight Per Cen.	Weight of Yolk.	Per Cent. Weight of Yolk of Whole Egg.	Weight of Shell.	Per Cent. Weight of Shell of Whole Egg.	Weight by Difference of White and Moisture.	Per Cent. Weight of White Egg of White and Moisture.
1	58-455	58-020	-744	18-610	32-075	4-770	8-222	34-640	59-703
2	57-579	57-040	-936	16-500	28-927	5-470	9-590	35-070	61-483
3	57-465	56-869	-1-037	17-879	31-439	4-805	8-449	34-185	60-112
4	56-070	56-280	-.688	16-260	28-891	4-610	8-191	35-410	62-918
5	58-285	57-885	-.086	18-225	31-485	5-349	9-241	34-311	59-274
6	62-560	61-950	-.975	19-145	39-904	5-075	8-192	37-730	60-904
7	59-040	58-705	-.367	18-555	31-607	5-685	9-684	34-465	58-709
8	59-327	58-500	-1-394	18-820	32-170	4-950	8-462	34-730	59-368
9	59-467	59-125	-.375	19-570	33-009	5-585	9-446	33-970	57-455
10	56-687	55-365	-.568	17-730	31-436	4-795	8-507	33-840	60-037
11	59-305	59-070	-.396	18-655	31-582	4-405	7-601	35-920	60-809
12	56-575	56-065	-.901	17-510	31-232	4-915	8-766	33-640	60-002
Averages.....			-.788		31-239		8-697		60-064

TABLE IV—SPECIALS.
WEIGHTS IN GRAMMES. MEASUREMENTS IN MILLIMETERS.

No.	Measurement before Boiling.		Weight Before Boiling.	Weight After Boiling.	Loss in Weight Ft. Cnt.	Weight of Yolk.	Weight of Per Cent. of Egg.	Weight of White.	Weight of Per Cent. of Egg.	Weight of Shell.	Weight Per Cent. of Eggs.	Loss of Weight in Moisture.	Loss per Cent in Moisture.
	Length.	Brdth.											
1	57.1	45.5	65.200	64.434	1.174	20.630	32.017	35.137	54.563	6.140	9.329	2.607	3.891
2	58.0	41.0	54.767	53.575	2.176	15.075	29.258	30.735	57.368	4.935	9.211	2.230	4.163
3	55.5	44.8	62.530	61.395	1.815	18.200	29.645	34.720	56.552	6.280	10.228	2.195	3.575
4	56.3	43.3	58.585	56.275	.064	15.940	28.325	32.315	57.423	5.515	9.800	2.505	4.462
*5	55.6	43.0	50.805	57.200	-.699	18.225	31.861	28.650	50.037	5.247	9.174	5.078	8.878
6	53.1	43.3	60.000	53.380	1.033	18.805	31.668	30.800	51.869	6.130	10.324	3.645	6.139
7	57.7	41.8	54.660	53.855	1.472	16.830	31.250	29.835	55.399	5.125	9.516	2.065	3.835
8	55.2	42.9	55.230	54.739	.088	15.900	29.046	30.305	55.363	5.605	10.222	2.939	5.369
9	58.3	43.0	60.300	59.220	1.791	19.800	33.434	31.032	52.401	6.105	10.310	2.283	3.855
10	56.0	42.3	54.320	53.600	1.325	17.660	32.947	28.550	53.265	5.405	10.084	1.985	3.704
11	58.8	44.4	62.165	61.790	.060	18.850	30.506	32.720	52.954	5.650	9.144	4.570	7.398
12	56.1	42.7	57.000	56.217	1.373	17.950	31.929	30.750	54.699	5.545	9.864	1.972	3.508
Averages.....													4.897
.....													9.784
.....													54.328
.....													9.784
.....													4.897

* Cracked white boiling.

ROSEWORTHY AGRICULTURAL COLLEGE.

HARVEST REPORT, 1916-17.

[By W. J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Principal Roseworthy Agricultural College.]

GENERAL REMARKS.

The College harvest in 1916-17 ranks second in magnitude to the magnificent season of 1909. Broadly speaking, farming operations have been eminently successful in every department, and the contented condition of the livestock reflects the character of the growth in pasture and cropped field. It has taxed our ingenuities to solve the many difficulties that the harvest presented, not the least important of which was the lack of spare hands to cope with the rush of work at the junction of the hay and grain harvests. Ultimately, however, the task was completed, and, as indicating the amount of work involved, it may be stated that there were carted over the weighbridge during the season 165 tons of berseem clover, 103 tons of cereal ensilage, 375 tons of hay, 200 tons of straw, and 10,786 bush. of grain.

There were in all 638.059 acres harvested, and, with a view to ensuring abundant returns, the great bulk of that area was devoted to varieties known to be reliable yielders. The demand for late mid-season wheats this season has been very keen, and our supply was quickly exhausted. However, next season we hope to have available larger stocks of those varieties that are in demand in districts dis-similar to ours in regard to soil and climate.

The weather during the harvest was on the whole favorable to the work, and this enabled us to complete operations in good time.

WEATHER CONDITIONS.

The salient features of the year 1915 were the early autumn rains, the very wet mild winter, and the late moist spring and summer. The first seeding rains fell earlier in this district than in most of the wheat-growing regions north of Adelaide, and in consequence our cereal crops were further forward when the winter set in. We were unable to graze them off, however, as no less than 7.93 in. of rain were registered in June and July, there being 38 wet days in the two months. The dangers to be feared with crops going into the spring in this luxuriant state are frosts at flowering time, heavy winds and driving spring rains causing the crop to lodge, blighting off of the heads,

and shrivelling of the grain in the event of an early summer, and finally depreciated returns through the attacks of red rust.

With regard to frosts, it may be remarked that the season on the whole was singularly free from a succession of very low temperatures. The heaviest frost experienced was on October 18th, when the thermometer fell to 32° F. This wrought havoc amongst the vines, but owing to the lateness of the season the cereal crops escaped harm. In addition, there were three mild frosts in June and one in July, but these were more beneficial than injurious in their effects.

All fears of shrivelled grain and blighted heads were ultimately dispelled by the regular succession of showers in October and November, but in the early part of September the prospects of an early summer appeared all too imminent. During the first three weeks of that month there was practically no rain at all, and the soft watery growth was being subjected to shade temperatures of from 75° to 85° Fahr., which it certainly did not appreciate. Our anxieties, however, were removed by the timely arrival of over 1½ in. of refreshing rain between the 21st and 24th of the month. Fortunately the late spring and early summer months were not accompanied by close muggy weather which is so favorable to the germination of spores and the spread of fungoid diseases, such as red rust (*Puccinia graminis*). This is a matter to be thankful for, as the overgrown wheat crops of 1915 could have offered but little resistance to fungoid invasion.

It is seen, therefore, that we succeeded in escaping three out of the four chief dangers to be feared at the end of the winter. The fourth risk we certainly did not manage to evade; in fact, we have never known in the history of the College a year in which the wheat crops lodged so flat on the ground as they did this harvest. In an early district like ours, where chief reliance must be placed on early varieties, it is not an infrequent occurrence for us to have to contend with "down" crops, and consequently we are not easily dismayed by the sight of storm-beaten wheat fields. In this instance, however, the weakness of the straw fibres, the weight of grain in the well-filled ears, and the incessant rain storms and high winds during October and November combined to force the crops on to the ground and counteract their efforts to recover again.

The great bulk of straw and flag, and the very tangled character of many of these beaten crops added very considerably to the harvesting difficulties; but, although in some instances appreciable losses were sustained, these were frequently due to the crop being allowed to lie long enough for the straw to lose its toughness. In most cases, where the crops were tackled within a reasonable time after the grain had ripened, the mechanical appliances now available were found to meet the needs of the situation.

TABLE I.—*Showing Monthly Rainfall at Roseworthy College for Seasons 1912-1916 inclusive, together with the Mean Fall for each Month during the period 1883-1915 (33 years).*

	1912.	1913.	1914.	1915.	Means,
	Inches.	Inches.	Inches.	Inches.	1883/1915
January	0.09	0.11	0.27	0.81	0.81
February	0.21	1.94	1.42	0.04	0.56
March	0.70	1.63	0.73	0.30	0.88
April	0.91	0.31	1.38	1.95	1.69
May	0.19	0.31	0.64	3.01	1.76
June	1.68	0.22	0.45	4.61	2.56
July	1.87	0.69	1.32	1.89	1.85
August	3.19	1.64	0.39	1.83	2.02
September	2.43	2.55	0.29	3.56	1.82
October	0.94	3.89	0.08	1.27	1.65
November	1.84	1.21	1.27	0.21	3.61
December	0.92	1.16	0.62	0.28	1.03
Totals	14.97	15.66	9.36	19.76	23.23
					17.41

TABLE II.—*Showing the Distribution of "Useful Rain" in the Years 1912-1916 inclusive, together with the Means for the previous 33 Years.*

	1912.	1913.	1914.	1915.	Means,
	Inches.	Inches.	Inches.	Inches.	1883-1915.
Seeding rains (April-May)	1.10	0.62	2.32	4.96	2.24
Winter rains (June-July)	3.55	0.91	1.77	6.50	7.93
Spring rains (August-October) ..	6.56	8.08	0.76	6.66	6.47
Summer rains (November)	1.84	1.21	1.27	0.21	3.61
Totals	13.05	10.82	6.12	18.33	20.25
					14.38
Percentage useful rain to total fall	87.17	69.09	65.38	92.76	87.17
					82.60

TABLE III.—*Showing Particulars of Weather experienced at Roseworthy College during the Year 1916.*

	Rainfall.	No. of days on which rain fell	Important Rains.	Minimum temperature, Fahr.	Mean minimum temperature, Fahr.	Frosts.	Max. temp., deg. Fahr.	Mean max. temp., deg. Fahr.
	Inches.		Date, Inches.			Date, Temp.		
January	1.15	5	4 .80	45.3	58.9	—	110	89.4
February .....	.16	2	9 .13	48.0	58.9	—	108.7	88.9
March .....	.62	2	7 .48	45.1	52.7	—	105	83.3
April	1.36	11	5/7 .24	41.0	49.34	—	85.3	69.56
			12/13 .24					
			21 .33					
			25/28 .51					
May .....	.88	6	14/17 .29	37.0	47.24	6	37.0	84.0
			30/31 .58					68.52
June	5.18	22	3 .77	36.4	45.61	15	38.2	64.8
			5 .24			16	38.0	58.43
			20/30 3.64			17	36.6	
July	2.75	16	7/10 .63	35.0	44.1	2	35.0	65.0
			17/20 1.10					58.2
			26/30 .87					

TABLE III.—*Showing Particulars of Weather experienced at Roseworthy College during the Year 1916—continued.*

	Rainfall. Inches.	No. of days on which rain fell.	Important Rains.	Minimum temp deg. Fahr.	Mean minimum temp. deg. Fahr.	Frosts.	Max. temp. deg. Fahr.	Mean max. tem. deg. Fahr.
			Date. Inches.			Date. Temp.		
August	3.0	21	2/8 1.27 12/16 .83 18 .20 20/22 .27 26/30 .43	37.0	43.1	—	73.8	59.96
September	1.82	7	21/24 1.78	34.5	46.6	—	88.3	67.80
October	1.65	13	4/5 .21 8/9 .45 22/23 .68	32.0	45.24	14 34.7 18 32.0 27 36.7	84.0	66.88
November	3.61	13	4/7 1.08 11/17 1.81 24/25 .72	41.2	50.44	—	89.3	69.72
December	1.05	9	11/14 .82	40.8	55.23	—	108.8	82.26
Totals	23.23	127				8 Frosts		

The total rainfall for 1915—23.23in.—has been exceeded on four previous occasions since 1883, namely in 1890 (27.58in.), 1889 (25.74in.), 1909 (24.05in.), and 1910 (23.87in.). With regard to “useful rain” this season’s figures—20.25in.—were beaten in 1889 (22.67in.), 1909 (21.15in.), 1893 (20.39in.), and were closely approximated in 1883 (20.17in.).

By comparison with the mean precipitation for the preceding 33 years we notice that last year’s fall is 5.82in. above the normal, and the whole of the increase fell within the period covered by the term “useful rain.” Two new monthly records were established, the June fall of 5.18in. being .57 of an inch better than the previous highest, whilst the November total—3.61in.—was .45 of an inch above the 1903 record.

In reviewing the distribution of the year’s precipitation over the different seasons we are struck immediately by the heavy falls registered in the winter months. We have to go back to 1890 to find a similar distribution. In that year the winter rains were even heavier, being 8.39in. as against 7.93in. in 1915. The summer rainfall (November), it has already been shown, exceeded all previous records, but the autumn and spring falls were not far removed from the mean figures for the corresponding periods over the preceding third of a century.

The effect of the summer showers was to lengthen the ripening period and fill out the ears and grain. The mean maximum temperatures during October and November were remarkably low, and the extreme readings of the thermometer during the same two months did not rise above 89.3° F. Thus the crops were given an opportunity of maturing their grain under conditions more akin to those that prevail in the south of England, and in consequence

we find that some extraordinarily high yields are being obtained, and we ourselves have succeeded in harvesting approximately 50 bush. per acre from one of our experimental plots.

In general, then, it may be stated that the season 1915 provided an ideal seeding season, a surplus of winter rains, an adequate supply of spring and summer rains which were accompanied by excessive and damaging winds, and lastly, a series of relatively low summer temperatures which ensured a plentiful harvest.

BERSEEM CLOVER.

Ever since 1911 a portion of the area reserved for irrigation has been devoted to berseem clover, and in our experience under Roseworthy conditions it is without a rival as a producer of nutritious green feed during the winter and spring.

We recognise, however, that in order to obtain maximum results with this crop it is absolutely essential to observe the following rules:—

1. The land must receive a dressing of 12 to 14 tons of farmyard manure per acre.
2. This must be spread and ploughed under not later than the middle of March. Depth of furrow 5 in. to 6 in.
3. Ploughed face to be rolled to a fine tilth and 2 cwt. 36/38 grade superphosphate drilled in.
4. Surface rolled again and 30 lbs. seed per acre broadcasted and pressed in with another turn of the roller.
5. Seeding to take place between 15th March and 15th April. The later the sowing the slower and less certain the germination.
6. Immediately after seeding give the seed bed a thorough irrigation.

This crop is so reliable at the College that it is difficult to understand why it does not receive more attention on the part of farmers. The yields per acre are very large, and consequently blocks of two to three acres would be found ample for most farmers. The crop needs no attention, except the application of water, and it is out of the road in ample time to make room for a summer crop such as maize, sorghum, or millet.

In the appended tables are shown the details of this season's yields and the annual and mean yields obtained at the College since it was introduced here.

TABLE IV.—*Showing Results of Berseem Harvest at Roseworthy College, 1916.*

Plot.	Area. Acres.	Cut.	Date Cut.	Total Yield.			Yield per Acre.		
				Tons	cwts.	lbs.	Tons	cwts.	lbs.
A, B	1.994	1st	May 22-July 4	22	11	78	11	6	59
		2nd	July 22-August 21	14	19	67	7	10	28
		3rd	September 14-October 4	19	6	48	9	13	89
		4th	November 23-December 7	14	8	99	7	4	98
					71	6	68	35	15	50

TABLE IV.—*Showing Results of Berseem Harvest, &c.—continued.*

Plot.	Area. Acres.	Cut	Date Cut.	Total Yield.			Yield per Acre.		
				Tons	cwts.	lbs.	Tons	cwts.	lbs.
L	1.398	1st	June 19-July 9	13	4	2	9	8	86
		2nd	August 22-September 8 ...	14	19	22	10	14	2
		3rd	October 5-November 4 . . .	15	17	76	11	7	27
		4th	December 7-December 23 . .	9	9	62	6	15	66
				53	10	50	38	5	78
M	1.251	1st	June 29-July 1	11	5	80	9	0	48
		2nd	September 9-September 22	14	13	84	11	14	91
		3rd	November 6-November 23 .	14	4	102	11	7	84
				40	4	42	32	2	111
Totals.....	4.643			165	1	48	35	11	8

Irrigation in dry years will be necessary after each cutting, but in wet seasons it may happen that the first watering is the only essential one. Obviously the number of subsequent irrigations will be determined by the rainfall. During last year the first soaking after seeding proved to be the only one required, and yet in Table IV. it is shown that we secured an average return of 35 tons 11cwt. 6lbs. to the acre, thereby beating our previous record of 34 tons 0cwt. 111lbs. cut in 1913.

In explanation of the returns summarised in Table IV. it should be stated that plot A.B. was sown on March 17th, plot L on March 30th, and plot M on April 10th. The aftermath following the final scything amounted to about 30cwt. per acre but this is not taken into account in the above tables. The influence of the time of seeding is well brought out by the fact that the latest sown plot yielded only three crops, whereas four cuts were taken off the other two.

TABLE V.—*Showing Yields of Greenstuff Obtained from Irrigated Berseem Clover at Roseworthy College, 1912-1916.*

Year.	Area. Acres.	Total Yield.			Yield per Acre.		
		Tons.	cwts.	lbs.	Tons.	cwts.	lbs.
1912	1.19	33	12	56	32	9	1
1913	3.201	108	19	97	34	0	11
1914	2.234	46	16	94	20	8	4
1915	3.411	98	16	66	28	19	3
1916	4.643	165	1	48	35	11	8
Means	—	—	—	—	30	5	11

In all 165 tons of green forage were carted off 4.6 acres between May 22nd and December 23rd, thus enabling us to give a regular and plentiful supply of fresh green fodder to the milking herd and also to supplement the normal ration of dry feed for the mares and foals with milk-producing greenstuff.

On reference to the above table it will be observed that the annual yields during the period 1912-1916 have been very uniform. It is true that in the drought year—1914—the acre yield dropped appreciably, but even so we weighed nearly 20½ tons off each acre sown, and over the whole five years period the mean return works out at 30 tons 5cwt. 91lbs. per acre. This amply justifies the opening statement that berseem ranks first amongst the winter growing soiling crops raised under irrigable conditions in this district.

ENSILAGE CROPS.

As one of the larger pits was occupied by some sorghum silage cut at the end of the summer, the cereal silage harvest was a lighter task than usual. In all, 103 tons 11cwts. 28lbs. was led over the weighbridge from Fields Nos. 3 and 6A.

The former was under Calcutta oats, and in the case of the latter field, it was only the headlands that were cut for silage, and consequently the acre-yield is relatively low. Details of the treatment and cultivation of these fields will be given later on in connection with the hay and wheat harvests. The silage harvest took place between the 20th and 31st October.

TABLE VI.—*Showing Particulars of Cereal Ensilage Harvest in 1916.*

Field.	Area.	Total Yield.			Acre Yield.		
	Acres.	Tons.	cwts.	lbs.	Tons.	cwts.	lbs.
No. 3	8.694	83	4	2	9	11	44
No. 6A (Headlands)	3.749	20	7	26	5	8	70
Totals.....	12.443	103	11	28	8	6	51

TABLE VII.—*Showing Yields of Ensilage, 1905-1916.*

Year.	Rainfall.		Area.	Total Yield.			Yield per Acre.		
	"Useful."	Total.		T.	C.	L.	T.	C.	L.
1905	14.23	16.71	—	—	—	—	8	10	0
1906	16.31	19.73	9.50	113	1	0	11	18	0
1907	13.96	15.13	17.15	92	2	75	5	7	34
1908	15.52	17.75	17.00	129	10	76	7	12	44
1909	21.15	24.05	16.962	169	18	90	10	0	3
1910	16.79	23.87	15.490	134	1	43	8	15	32
1911	9.45	13.68	30.740	152	16	28	4	19	47
1912	13.05	14.97	40.700	141	4	73	3	9	45
1913	10.82	15.66	61.311	115	14	24	1	17	70
1914	6.12	9.36	—	—	—	—	—	—	—
1915	18.33	19.76	27.384	133	14	107	5	12	33
1916	20.25	23.23	12.443	103	11	28	8	6	51
905-16 (Average for 11 years)							6	18	104

The yield of over 9½ tons per acre from Field No. 3 is highly satisfactory, being above the average returns for all previous seasons except 1906 and 1909. It also compares very favorably with the mean return of 6 tons 18cwts. 104lbs. for the period 1905-1916. The headland in 6A was sown with King's White a month later than No. 3, and the soil being a heavy clay, the wheat did not

get a proper start before the June downpour arrived, hence it failed to yield as high as might have been expected in such a favorable year.

The effect of the past season has been to raise the mean acre yield by 2 $\frac{2}{3}$ cwts.

RELATION BETWEEN ENSILED CEREAL CROPS AND QUANTITY OF TWINE USED.

Following the plan adopted last season, the twine requirements of the cereal crops bound up for silage have been recorded and are shown below:—

TABLE VIII.—*Showing Quantity of Crop Cut for Silage per Ball of Twine used.*

Year.	Area. Acres.	Total Yield.			Acre Yield.			Weight of Crop Cut.		
		T.	C.	L.	T.	C.	L.	T.	C.	L.
1915	27-384	153	14	107	5	12	33	4	7	35
1916	12-443	103	11	28	8	6	51	4	16	35
Average					6	19	42	4	11	62

THE HAY HARVEST.

As we had a balance of approximately 600 tons of hay on hand it was decided to restrict haymaking this season to three home paddocks, comprising an area of about 80 acres. It was estimated that this would return us between 225 and 250 tons, after allowing for losses sustained in binding crops that had been knocked down and tangled by rough weather. Our estimate, however, proved to be far too low, as the hay area yielded nearly 280 tons, and in addition the headlands cut almost 7 $\frac{1}{2}$ cwts. better than the mean hay yield for the farm for the period 1904-1915. Ultimately we weighed into the stack 374 tons 17cwts. 8lbs. of hay, one-third of which was oaten and the balance wheaten. The quality of the hay was better than in 1915, being almost free from rust and well furnished with grain. It was, of course, ranker than hay grown in years of normal rainfall; but, fortunately, we were able to complete hay-carting before the new year, and hence the loss in nutritive qualities and palatability occasioned by long exposure in the stook were avoided.

The fields in which the 1916 hay crop were grown were Nos. 7A, 7B, and No. 3.

TABLE IX.—*Showing Particulars of 1916 Hay Harvest.*

Field.	Area Acres.	Total Yield			Acre Yield		
		Tons	cwts.	lbs.	Tons	cwts.	lbs.
7A	21-064	77	12	73	3	13	80
7B	22-443	75	16	82	3	7	80
3	39-236	126	5	5	3	4	40
Totals.....	82-743	279	17	48	3	7	73
Headlands	38-984	94	19	72	2	8	82
Grand Totals	121-727	374	17	8	3	1	66

FIELD NO. 7A.

Previous History.

1897. Pasture.	1903. Sorghum.	1909-11. Sown grasses.
1898. Wheat.	1904. Bare fallow.	1912. Maize, sorghum, and
1899. Pasture.	1905. Wheat and oats.	bare fallow.
1900. Oats.	1906. Kale.	1913. Barley, oats, and
1901. Pasture.	1907. Maize and sorghum.	lucerne.
1902. Oats.	1908. Barley.	1914. Pasture.
		1915. Bare fallow.

This field contains 21 acres of relatively heavy clay loam with an old drainage depression running through it. Being the home paddock, it has been frequently set aside for forage crops or else reserved for pasturage, and every year it has been heavily stocked at some period. From the summarised history given above it will be seen that it has only been under cereals seven times in the last 20 years, and only twice before during that period has it borne a wheat crop. The soil, therefore, was in a high state of fertility and even in a normal season there was good reason to anticipate excellent results.

The land was broken up by October 18th and left in the rough till just before seeding. It was then rolled with the heavy clod-crusher and disc-cultivated during May, and drilled with King's Red (Selection 7) wheat at the rate of 100lbs. per acre, together with 2cwts. of superphosphate. The harrows preceded and followed the drill, the teams finally leaving the field on June 9th.

The crop stood out splendidly and grew very fast in September during the dry spell. It then began to lean over, and by the time it was ready for cutting it had lodged to such an extent that the binders could only work in two directions. This made the work very tedious, but the yield was magnificent, and will probably constitute a record here for many a year. The binders started the last day in October, and the last load was hauled out on the 4th of December.

FIELD NO. 7B.

Prior History.

1897. Pasture.	1904. Bare fallow.	1910. Maize and sorghum.
1898. Wheat.	1905. Wheat and oats.	1911. Wheat and oats.
1899. Pasture.	1906. Crimson clover.	1912. Pease.
1900. Oats.	1907. Pasture.	1913. Wheat and oats.
1901. Pasture.	1908. Maize and sorghum.	1914. Pasture.
1902. Oats.	1909. Barley.	1915. Bare fallow.
1903. Pasture.		

There are 22 acres of good wheat land in this field, which is lighter in character, and contains more limestone than the previous paddock. It is situated on rising ground, and when in grass furnishes sweet, nutritious pasture. Though more distant from the Farm it is also treated as a home field, and has, therefore, been used more largely for grazing than cropping. It has carried wheat only four times, and has been bare-fallowed but twice in the last 20 years. The intention was to top-dress this and the preceding field with lucerne, and to let them lie out again as pasture paddocks for two or three years, but owing to the sudden downpour in June this idea had to be abandoned.

The land received precisely the same treatment throughout as the companion field No. 7A, being sown with the same kind of seed and manure. The difference of 6cwt. in the yield is to be attributed to the lighter quality of the land.

FIELD No. 3.

Past History.

1897. Pasture.	1903. Pasture.	1908. Pasture.
1898. Wheat.	1904. Fallow.	1909. Sorghum.
1899. Pasture.	1905. Wheat, oats, and	1910. Wheat and oats.
1900. Oats.	barley.	1911/1914. Lucerne.
1901. Pasture.	1906. Rape	1915. Bare fallow.
1902. Oats.	1907. Pasture.	

With a view to reducing hay hauling to a minimum, the fields nearest to the steading were sown for hay, and consequently it was arranged that this field, which adjoins the other two already described should be sown with Calcutta oats as a hay crop. There are in all 47.93 acres in this field, and the soil is very variable in character. Chiefly it consists of a greyish limestone bank carrying plenty of stone, but it slopes down on the western side to a heavy black "crab-hole" flat. It has not been heavily cropped for many years, but it has been very heavily stocked, as it carries abundance of natural feed on the bank in normal years, and always furnishes late grazing on the low-lying portion. Turning to the tabulated history it will be noticed that this is the fourth wheat crop grown on it since 1897. In 1905 it yielded 3 tons 9cwt. 74lbs. of hay, and in 1910 3 tons 9cwt. 72lbs. of hay per acre. From 1910 to 1914 it was under lucerne, and last year it was fallowed during July and August, broken down with the disc cultivator in November, cultivated a second time in April, and drilled on a harrowed seedbed with 100lbs Calcutta oats and 2cwt. superphosphate per acre by the 3rd of May. A stroke of the harrows completed seeding operations.

An area of 8.694 acres was cut early for silage, and the remainder, 39.236 acres, was cut for hay in the last fortnight of November. This was a most

troublesome crop to bind, and the stubble was exceptionally long and ragged. Nevertheless we harvested 3 tons 4cwt. 40lbs. per acre of excellent oaten hay, which was carted and stacked by the 28th of December.

HEADLANDS.

The total area cut round the other fields to facilitate harvesting was 38-984 acres, and it averaged 2 tons 8cwt. 82lbs. per acre. Included in this area are headlands from two barley fields which yielded less than a ton, and also scrub headlands which, as the result of the proximity of trees, cut only 36cwt. per acre.

THE AMOUNT OF HAY CUT PER BALL OF BINDER TWINE.

TABLE 10.—*Showing the Relation between a Ball of Binder Twine and the amount of Hay Cut for the Period 1911/1916.*

Year	Area. Acres.	Yield per Acre.			No. of Balls.	Hay Cut per Ball.		
		T.	C.	L.		T.	C.	L.
1911	200-100	1	8	6	120½	2	6	65
1912	237-223	1	14	9½	200½	2	0	54
1913	228-909	0	16	6	108	1	14	3
1914	232-406	0	14	78	85	2	0	17
1915	341-649	2	7	23	406	1	19	81
1916	121-727	3	1	66	166½	2	5	3
Average for 1911-1916		1	13	82	—	2	1	0

For the past season the amount of twine used per ton of hay has been lower than all the preceding years, with the single exception of 1911. The figures, however, must be understood as applying to a year when harvesting was beset with very great difficulty. In many instances the binders could only work advantageously in one or at most in two directions, and even then it was by no means an easy matter to prevent the knotters from missing sheaves. The result was that the proportion of untied sheaves was unusually high, and as no account of the loose stuff as distinct from the sheaved hay was kept, the ball of twine has received more credit than is strictly due to it. This is an accidental factor that disturbs our records occasionally, but it does not seriously affect the mean figures for a period of several seasons. We see then that on the average the amount of hay bound per ball of twine works out at 2 tons 1cwt.

AVERAGE HAY YIELD, 1916.

If we confine our attention in the first instance to the fields intended to be used for hay crops, namely 7A, 7B, and 3, we will see that the wheaten hay crops averaged 3 tons 10cwt. 69lbs. and the oat crop 6cwt. 29lbs. less. By combining these averages with the yield from the headlands, the mean return is seen to drop to 3 tons 1cwt. 66lbs., which, however, is still a highly

satisfactory average, and has only once been exceeded since 1904. This was in 1905, when the corresponding yield worked out at 3 tons 2cwts. 7½lbs., or 1cwt. 5lbs. per acre above the 1916 average.

The mean acre yield for the last 13 years is 2 tons 2cwts. 68lbs., an increase of 1cwt. 65lbs. on the mean return for 1904/1915. If we place a valuation of 35s. per ton on hay and 3s. 6d. a bushel on wheat, we find that the gross return from hay-growing is £3 15s. per acre on the average, whilst the corresponding return from wheat is £3 2s. 6d. This leaves a credit balance of 12s. 6d. per acre per annum in favor of hay-growing, and when the whole period of 13 years is considered, this represents a total amount of £8 2s. 6d. per acre. This bears out the contention that this locality is better adapted for hay than wheat.

TABLE XI.—*Showing Average Hay Yields on the College Farm, 1904/16*

Year.	Rainfall.		Area. Acres.	Total Yield.			Average Yield.		
	"Useful." Inches.	Total. Inches.							
1904	11-60	14-70	93-000	238	0	0	2	11	22
1905	14-23	16-71	67-000	198	8	22	3	2	71
1906	16-31	19-73	93-000	241	0	0	2	11	90
1907	13-96	15-13	51-000	91	14	20	1	15	108
1908	15-52	17-75	112-800	293	6	23	2	7	5
1909	21-15	24-05	145-397	404	4	54	2	15	68
1910	16-79	23-87	94-900	224	7	6	2	7	31
1911	9-45	13-68	200-100	290	12	94	1	8	6
1912	13-05	14-97	248-450	432	7	49	1	14	90
1913	10-82	15-66	258-200	207	7	111	0	16	7
1914	6-12	9-36	247-647	181	13	107	0	14	75
1915	18-33	19-76	341-649	806	7	36	2	7	23
1916	20-25	23-23	121-727	374	17	8	3	1	66
Average for 13 years							2	2	68

PEA HARVEST.

Field peas cannot be grown satisfactorily as a grain-producing crop on this farm every year, but in late seasons such as we have just experienced they flourish and pod well. As a rule they are grown solely as a grazing crop, and it was with this object in view that they were sown last autumn. However, they developed so well that in view of the abundance of good paddock feed available elsewhere I decided to hold one field back for grain, and the results obtained justified the action. The field selected, No. 1, comprises 11-46 acres of light soil with a good deal of limestone on the surface. The past history is as follows:—

1898 Wheat.	1907. Wheat.
1899. Pasture.	1908/13. Pasture,
1900. Oats.	1914. Sorghum (failure).
1901/06. Pasture.	1915. Wheat (twice harvested).

Considering that the field has only carried one crop since 1907, it is obvious that the soil was well fitted to support another, and the condition of the land, coupled with the mildness of the season, gave the peas every advantage. The 1915 stubble was disc ploughed the first week in June, and immediately harrowed down and sown with 2bush. of Early Dun peas and 2cwts. of 36/38 grade superphosphate per acre. Beyond a harrowing on the drilled surface no after-treatment was given. Germination was brisk and even, and the plants made good headway during July and August, and the crop was nearly in full flower when the October frost occurred. Yet it came through without a check. It did not make as much haulm as might have been expected, but the pods were plentiful and well filled. Early in December advantage was taken of a showery spell to mow the crop with the ordinary grass mower fitted with the Tolton pea harvester attachment, and within a week the old Ransomes thresher was fitted with a smooth concave and moved out to the field. We threshed in all 352bush. 8lbs. of peas, or 30bush. 4lbs. per acre. The sample was clean and sound, although not so plump as peas grown under humid conditions.

BARLEY HARVEST.

The barley crops of 1916 did not prosper so well as most of the other cereals, but it is as well to admit at the outset that the chief reason for this was the delay in harvesting due to a commendable ambition to complete hay-stacking before the new year. It is regrettable, however, that the saving of the hay in good condition should have led to such heavy losses in the barley fields, and these circumstances should be kept prominently in mind lest the falling off in the returns should be interpreted as indicating inability on the part of barley to thrive under the soil and weather conditions experienced last season. That this is not the case is evidenced by the fact that some varieties which were taken off at the right time returned over 50bush. to the acre. What actually happened was that during December the ripe barley crops were knocked about severely by a succession of hot, north-west winds. The high temperatures then prevailing caused the straw to become very brittle, and under the influence of the violent winds the heads snapped off, and the grain was shed to such an extent that I doubt if as much as half the grain grown was recovered. From a farming point of view I do not regret this very much, as a very large amount will return to us in the shape of sheep feed, and I still consider it pays better to secure hay in December and suffer the loss in barley instead of garnering the whole of the grain, which would have meant the caking of impoverished weather-worn stuff out of the hay fields in February. It is only in so far as the loss in the barley harvest affects the continuous records of the College crops that the circumstances are regrettable, and it is for this reason principally that I have been at some pains to explain the circumstances.

TABLE XI.—*Showing Details of the Barley Harvest, 1916.*

Field.	Area.	Total Yield.		Acre Yield.	
	Acres.	Bush.	Lbs.	Bush.	Lbs.
Nottle's A	24.491	600	48	20	23
Daly's B and C	97.778	1,025	2	10	24
Experimental Field	5.929	49	47	8	21
Totals	128.198	1,575	47	12	15

NOTTLE'S A.

Prior History.

1897. Bare fallow.	1903. Bare fallow.	1909. Wheat and oats.
1898. Wheat.	1901. Wheat.	1910-12. Pasture.
1899. Wheat.	1905. Bare fallow.	1913. Bare fallow.
1900. Bare fallow.	1906. Wheat and barley.	1914. Wheat (failure).
1901. Wheat.	1907. Pasture.	1915. Wheat.
1902. Pasture.	1908. Bare fallow.	

The soil in this field is a free working loam and well suited to the needs of a barley crop. The stubble was lifted early in June, and immediately cultivated to a tilth and sown about the middle of the month with 2-wt. of superphosphate and a number of varieties of four and six-rowed barleys. The highest yield was 56bush. 41lbs. obtained from a late type of four-rowed barley known as Tunis 2 A. Two early six-rowed barleys, Tunis 7 C and Tunis 7 bis., returned 51bush. 12lbs., and 50bush. 44lbs. respectively, whilst an early mid-season type of the same species—Tunis 8 C—gave 36bush. 44lbs. In the case of some of the other varieties, particularly the early ones, sparrows stripped a large percentage of the heads, and, as is to be expected in experimental trials of this kind, some of the barleys proved unsuitable. The more promising varieties will be carried on for a year or two longer until we are able to determine their values in relation to those already in regular use.

DALY'S B. AND C.

There are approximately 100 acres in this block, and although the land is of good average quality it is subject to flooding in wet years, a factor that seriously handicapped the barley crop last season.

Past History.

1912. Bare fallow.	1914. Bare fallow.
1913. Wheat.	1915. Wheat and barley.

This field was treated in precisely the same manner as Nottle's A, but was sown with short-head barley (Selection 8) at the rate of 70lbs. per acre. The June floods drowned out portions of the crop and gave the whole field a set back from which it did not recover till the spring. The crop was small, but the heads were well-filled and the barley harvested was exceptionally plump.

AVERAGE BARLEY YIELD.

TABLE XII.—*Showing General Average Barley Yields on the College Farm, 1904-1916.*

Season.	Rainfall.		Area.	Average Yield	
	" Useful," Inches.	Total. Inches.		per Acre. Bush. Lbs.	
1904	11.60	14.70	27.86	38	33
1905	14.23	16.71	65.73	25	4
1906	16.31	19.73	51.00	40	38
1907	13.96	15.13	79.30	31	21
1908	15.52	17.75	94.83	43	49
1909	21.15	24.05	75.27	35	0
1910	16.79	23.87	113.42	37	9
1911	9.45	13.68	76.09	39	31
1912	13.05	14.97	123.82	22	21
1913	10.82	15.66	91.09	12	19
1914	6.12	9.36	12.85	2	26
1915	18.33	19.76	24.44	41	40
1916	20.25	23.23	128.198	12	15
Mean for 13 years				29	24

The above figures show that the 1916 yield was lower than has been recorded in any previous year except the drought season, 1914. The effect has been to reduce the mean barley yield from 30 bush. 45 lbs. to 29 bush. 24 lbs. However, even on this figure of nearly 30 bush. the cultivation of barley on stubble ground offers many inducements to farmers who are anxious to get the most out of their land.

THE OAT HARVEST.

The area under oats this year was nearly all cut out for silage and hay; only 6.356 acres were harvested for grain. A small paddock of 3.528 acres known as Grainger's Sheep Field, was ploughed up towards the end of April and drilled in with 80 lbs. of Scotch Grey oats (Selection 3), a variety that appears likely to find a permanent place in our cropping scheme. The crop went down so badly in patches that it was decided to cut and thresh it. Eventually we obtained an average yield of 35 bush. 37 lbs. per acre.

In another field, No. 6 B, an area of 2.828 acres under oats was divided into three plots: these carried crops of Sunrise, Scotch Grey, and Algerian Tartar oats. The former is a white-grained variety, but in most other respects resembles Algerian oats. Algerian Tartars are also white grained, but they ripen later and are shorter in the straw. They did not yield heavily, but owing to the condition of the crop considerable waste occurred in the harvesting. Both of these varieties are well deserving of further trial.

AVERAGE OAT YIELD.

TABLE XIII.—*Showing Average Yields of Oats on the College Farm, 1905-16.*

Season.	Rainfall.		Area. Acres.	Yield per Acre.	
	"Useful." Inches.	Total. Inches.		Bush.	lbs.
1905	14.23	16.71	20.00	43	30
1906	16.31	19.73	33.50	41	18
1907	13.96	15.13	20.00	*	—
1908	15.52	17.75	20.00	22	28
1909	21.15	24.05	23.52	43	19
1910	16.79	23.87	24.60	28	15
1911	9.45	13.68	22.82	22	8
1912	13.05	14.97	52.00	10	4
1913	10.82	15.66	3.33	11	36
1914	6.12	9.36	—	—	—
1915	18.33	19.76	1.10	32	32
1916	20.25	23.23	6.36	27	15

Average for 10 years (omitting 1907 and 1914) 28 14

*Complete failure from feeding off with sheep.

THE RYE HARVEST.

As in former years, a small area was devoted to rye crops mainly for the sake of the straw. They were located in Field No. 6 B on land that is heavier than this crop usually affects. The seed was sown at the rate of 60lbs. on a fallowed seed-bed, and the customary dressing of 2cwt. superphosphate was applied at the same time.

Appended are the details of the seasonal averages, and also the mean yields for the period 1909-1916:—

TABLE XIV.—*Showing Details of Rye Crops, 1916.*

Variety.	Area.		Yield per acre.	
	Acres.		Bush.	lbs.
March	0.637	..	6	30
Multicaule	1.523	..	9	18
Schlanstedt	0.637	..	7	19
Giant Winter	0.637	..	6	31

Average yield of rye, 1916 7 52

TABLE XV.—*Showing Yields Per Acre of Rye on College Farm, 1909-1916.*

Season.	March.		Multicaule		Giant		Schlanstedt		Means.
	Rye.		Rye.		Rye.		Rye.		
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush. lbs.
1909	7	46	8	44	11	34	4	3	8 15
1910	16	4	12	40	12	36	15	14	14 9
1911	20	9	11	24	9	45	9	48	12 43
1912	15	6	11	22	11	4	10	13	12 0
1913	11	49	11	42	12	0	7	0	10 36
1914	3	20	3	11	0	47	0	51	2 0
1915	22	41	23	47	23	24	27	31	23 35
1916	6	30	9	18	6	31	7	19	7 52
Means eight years	12	54	11	31	11	0	10	15	11 24

THE WHEAT CROP.

The outstanding features of the 1916 wheat season were the bulk of straw and flag, the high grain yield, and the large size and plumpness of the grain. It was noticeable that some of the very late varieties, which produce 50bush. to 60bush. crops under humid conditions were encouraged by the late rains to develop more ears and more grains to the spikelet than they were able to mature, and in consequence some of the finest looking heads contained grain of inferior quality. All the early and mid-season varieties, however, matured an excellent sample, as is evidenced by the low percentage of tailings from the graders as well as by the extremely high yields obtained.

Up till 1916 the heaviest wheat crop harvested on the College farm was a block of Beardless Odessa, which returned 42bush, 40lbs. in 1912. This season we threshed three plots of King's White (Selection 6) in Field No. 4, and secured from them 49bush. 28lbs., 47bush. 20lbs., and 46bush. 5lbs. per acre respectively. The first plot received quarter of a ton of lime on the fallow and 2cwts. of superphosphate at seeding; the second 14 tons of farm-yard manure, 2cwts. of superphosphate, and ½wt. of sulphate of potash at seeding; and the third was dressed with 3cwts. superphosphate and 1cwt. of nitrate of soda. However, I do not wish to create the impression that these exceptionally high returns which have been obtained from small areas are anything more than a guide to the possibilities of the land when brought under climatic conditions that approximate to those that obtain where 50bush. and 60bush. crops are the reward of good farming.

The garnering of the harvest has not been carried out as cleanly as usual, for although the employment of modern machines and appliances has reduced the wastage and enabled us to cope with the "down" crops, yet the losses have been heavier than usual. There is no doubt that if we were to experience a succession of such seasons it would be a sound economic policy to resort to binders and threshers. Those who have had occasion to burn off stubbles will have been struck with the leakage, even on fields that have returned from 30bush. to 35bush., in the bags. Naturally in a year like this, when the crops are returning from 50 to 100 per cent. above the mean yield, and with the prospect of a good market, the wastage does not attract serious attention. Nevertheless, it certainly has occurred, and I am convinced that had the crops in this locality been cut and threshed they would have filled at least another bag, and possibly two bags, to the acre. Not only was the stripping less thorough, owing to the state in which the crops were at harvest time, but in addition the loss incurred was increased by the shattering of the over-ripe heads as they reached the comb. This leakage is always to be expected in years when the wheat yield is phenomenally high, since our methods are very properly adapted to suit average conditions. On the

College crops we employed all the known methods of harvesting in order that students might have the opportunity of becoming personally familiar with them.

The season was not favorable to fungoid attacks, indeed the crops were singularly free from smut, bunt, flag smut, and rust. Owing to late fallowing the plots in one field showed signs of an attack by "take-all" (*Ophiobolus Graminis*), but otherwise we suffered no losses through disease. All seed sown was pickled in a $1\frac{1}{2}$ per cent. bluestone solution.

The total area of land under wheat for grain on the College farm last year was 211.512 acres, and of this 70.65 acres had carried forage crops the year before. The bare-fallow wheat rotation has again demonstrated its superiority, the average return per acre from farm land so treated being 21 bush, 32 lbs., as compared with 20 bush, 14 lbs. from land that carried rape and kale crops in 1915.

It will be understood in connection with the field notes following the appended table that in all cases the wheat is sown at the rate of 100 lbs. of graded seed and the superphosphate at the rate of 2 cwt. of 36/38 quality to the acre, unless otherwise stated.

TABLE XVI.—*Summary of Wheat Returns, 1916.*

	Area. Acres.	Total Yield. Bush. lbs.	Acres	Yield. Bush. lbs.
Farm crops	211.512	4,887 2	23	6
Experimental crops (1 acre and over)	119.425	3,297 20	27	37
Totals	330.937	8,184 22	24	44
Experimental plots (under 1 acre)	18.857	473 58	25	8
Grand totals	349.794	8,658 20	24	45

FIELD No. 5 B.

This field is 83 acres in area. Its past history is indicated below:—

1897. Bare fallow.	1903. Bare fallow.	1909. Wheat.
1898. Wheat.	1904. Wheat.	1910-11. Pasture.
1899. Wheat.	1905. Pasture.	1912. Bare fallow.
1900. Bare fallow.	1906. Bare fallow.	1913. Wheat.
1901. Wheat and oats.	1907. Wheat.	1914. Pasture.
1902. Pasture.	1908. Bare fallow.	1915. Bare fallow.

The soil enclosed in this field is an adhesive clay for the most part, with a number of claypans scattered through it. It was fallow-ploughed between August 20th and September 23rd, and in the following autumn was worked down after the first rains and prepared for a hay crop. King's White (Sele-

sion 6) was therefore sown at the rate of 2bush., which is our normal seeding for wheaten hay.

The abundant yield from the other hayfields, however, enabled us to harvest this crop for grain, and as it was lying well over in some parts the reaper-thresher was employed for the purpose. From the 78.393 acres we took off 1,994bush. 40lbs., which is equivalent to a yield of 25bush. 27lbs. per acre.

EBRARY'S C.

This field consists of a medium class of mallee land rising to a sandy ridge at the south-eastern boundary. Its past history is as under:—

1899. Bare fallow.	1905. Pasture.	1911. Barley.
1900. Wheat.	1906. Bare fallow.	1912. Pasture.
1901. Bare fallow.	1907. Wheat.	1913. Bare fallow.
1902. Wheat.	1908. Rape.	1914. Wheat.
1903. Bare fallow.	1909. Bare fallow.	1915. Bare fallow.
1904. Barley.	1910. Wheat.	

This field has always given good results when sown with Gluyas, and we therefore choose this variety for 1916 seeding. The fallow was started on July 23rd and finished on August 4th. In October and January it was cultivated and the preparatory work carried out in May consisted of another stirring with the ordinary fixed-tine cultivator. Between the 7th and 10th of June it was sown with selections 7, 8, 9, and 10 of Gluyas wheat and the drilling was then harrowed.

The wheat grew apace and began to show a decided lean very early in the season. It never recovered from this, but, on the contrary, went down nearer to the ground with every storm. In addition, it had to be left till late in January before the reaper-thresher could be spared to take it off. Nevertheless the results were eminently satisfactory, the field averaging 30bush. 25lbs. of bright plump grain. It would be safe to estimate the loss in harvesting this field at 5bush. to 6bush. per acre. Details of the harvest are here shown:—

TABLE XVII.—*Showing Particulars of Wheat Harvest in Ebsary's C., 1916.*

Variety.	Selection.	Area. Acres.	Total Yield. Bush. lbs.	Acres	Yield Bush. lbs.
Gluyas	10	1.819	43 26	23	53
Gluyas	9	15.345	508 2	33	6
Gluyas	8	14.051	426 46	30	22
Gluyas	7	4.156	97 37	23	29
Totals.....		35.371	1,075 51	30	25

DAHLITZ.

This field was sown this year with a series of pedigree wheats, all of which have been bred or raised by selection at the College. The past history of this field is summarised below :—

1899. Purchased and fallowed.	1904. Pease.	1910. Pasture.
	1905. Oats.	1911. Bare fallow.
1900. Wheat.	1906. Wheat.	1912. Wheat and barley.
1901. Bare fallow.	1907. Rape.	1913. Pease and barley.
1902. Wheat and oats.	1908. Bare fallow.	1914. Sorghum (failure).
1903. Barley.	1909. Wheat.	1915. Bare fallow.

This field was worked in November, 1914, and sown with sorghum, but very few seeds germinated, and the land was, therefore, virtually a summer fallow. In August of the next year it was fallowed and turned up rather rough. It was rolled with a heavy roller at the end of October and disc-cultivated in November. The preparatory working for this year's crop began with a discing in April; the disc cultivator was followed by the scarifier, fluted roller, scarifier and harrows. Drilling took place between May 17th and 24th, the seed being sown at 100 lbs. per acre. The varieties of wheat used are as follows:—Anvil, Eureka, Sevens, Daphne, Cad, Marshall's No. 3a, College Eclipse, Basil, and Caliph.

In the preparation of this field for seeding, I am inclined to think that the land was worked too often before the rains had soaked well down. Evidence of white heads was to be found running across the plots, and yet fields which were later ploughed and not subject to the same amount of consolidating tillage, were quite free from it. The soil is of a light loamy character, and the overworking in April produced too fine and powdery a seedbed, and the yields suffered in consequence. In addition, several of the wheats tried are new types, and their ability to yield under field conditions has not hitherto been tested. Two of the plots were taken off with the reaper-thresher—College Eclipse and Daphne—whilst the remainder was harvested with the ordinary stripper. The yields were as follows:—

TABLE XVIII.—*Showing Details of Wheat Yields from Dahlitz, 1916.*

Variety.	Selection.	Area. Acres.	Total Yield. Bush. lbs.	Acre Yield. Bush. lbs.
Cad	3	2.431	41 48	17 12
College Eclipse	7	4.396	68 24	15 34
Basil	1	9.147	139 53	15 18
Caliph	1	2.144	32 13	15 2
Sevens	—	2.166	27 55	12 53
Marshall's 3a	3	2.890	35 5	12 8
Daphne	3	2.063	24 15	11 45
Anvil	3	0.775	7 46	10 1
Eureka	2	1.084	9 8	8 29
Total for Field		27.096	386 27	14 16

NOTTLE'S C.

Previous History.

1897. Bare fallow.	1904. Wheat.	1910. Pasture.
1898. Wheat.	1905. Bare fallow.	1911. Pasture.
1899. Wheat.	1906. Wheat & barley.	1912. Pasture.
1900. Bare fallow.	1907. Pasture.	1913. Bare fallow.
1901. Wheat.	1908. Bare fallow	1914. Wheat, oats, and
1902. Pasture.	1909. Wheat, oats, and	barley (failure).
1903. Bare fallow.	lucerne.	1915. Rape.

As this field had not been heavily cropped since 1909 it was decided to make good the shortage of fallow in 1915 by bringing under wheat this field and Daly's A, which had borne grazing crops the year before.

The rape and mustard stubble was ploughed, with the disc implement, rolled with the Cambridge roller, cultivated and drilled between the 10th and 24th of May. Two varieties of wheat were sown, namely, Queen Fan and King's Red. The latter tended to "lodge" but the Queen Fan block withstood the weather well, and had it been possible to harvest it a fortnight earlier the yield would have been considerably increased. For crops not preceded by fallow the results, even as they stand, are very pleasing, and the paddock average of 26bush. 7lbs. leaves no grounds for complaint.

TABLE XIX.—*Showing Results Obtained in Nottle's C, 1916.*

Variety.	Selection.	Area.	Total Yield.		Average Yield.
		Acres.	Bush.	lbs.	Bush. lbs.
King's Red	10	3-248	98	58	30 28
King's Red	9	3-092	272	7	29 56
King's Red	8	4-332	109	3	25 10
Queen Fan	6	3-163	71	39	22 39
Queen Fan	4	6-303	131	3	20 48
Totals for whole field		20-138	682	50	26 7

DALY'S A.

This forms portion of 150 acres of land purchased in 1912. It comprises 50 acres of good wheat land, but in wet years the southern boundary becomes practically water-logged.

Prior History.

1912. Bare fallow.	1913. Wheat.	1914. Bare fallow.	1915. Kale.
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Like Nottle's C, this was under a winter-growing forage crop in 1915. The forage crop in this instance was thousand-headed kale, and it was grazed right up to April 29th, the date on which the ploughs started. The cultivators were at work from May 11th to May 16th, and the roller followed shortly after. At the end of May it was drilled in with King's Red, Selection 7, but rain interrupted the work and seeding was not concluded till June 9th. Being late sown it suffered from the heavy winter rains and a thin crop resulted, especially in the low-lying portion where numerous depressions were occupied

wholly by canary grass and marsh weeds. This crop was "laid" to a greater extent than most of the crops of this variety, and the percentage lost in harvesting was relatively high, in fact, the yield per acre would certainly have exceeded seven standard bags had it been all harvested. Eventually we gathered 747 bush. 14 lbs. from the 44.514 acres, which works out at 16 bush. 47 lbs. per acre.

EXPERIMENTAL WHEAT CROPS.

Of those plots over an acre in extent the great bulk were sown with King's White. Selection 6 was grown in Field No. 4 and the reversion plots; selection 9 in Grainger's manure plots; and selection 10 in the depth of ploughing plots. Late Gluyas occupied the 27 acres under cultivation tests in Grainger's A. The particulars of the 1916 harvest of these plots are shown in the appended tables:—

TABLE XX.—*Showing Yields of Varieties Grown on Experimental Areas in Plots of One Acre and Over.*

Field.	Variety.	Selection.	Area. Acres.	Total Yield. Bush. lbs.	Acre Yield. Bush. lbs.
No. 4	King's White ...	6	58.150	1,634 15	28 6
Grainger's D—Reversion Plots	King's White ...	6	6.400	222 24	34 45
Grainger's C—Manure Plots	King's White ...	9	14.100	379 33	26 55
Grainger's B—Depth of Ploughing Plots	King's White ...	10	2.802	64 38	23 4
Grainger's A—Cultivation Plots	Late Gluyas	6	24.559	700 39	28 32
6a	Yandilla King ...	4	1.824	63 28	34 48
	Anvil	4	1.144	26 37	23 16
	Basil	3	1.045	23 35	22 34
	Queen Fan	7	1.161	26 10	22 32
	Canaan	4	1.127	23 23	30 45
	Caliph	1	3.316	65 9	19 39
	Daphne	4	1.575	29 29	18 43
	Eureka	3	1.078	19 12	17 49
	College Comeback	9	1.144	18 48	16 26
Totals			119.425	3,297 20	27 37

DIFFERENT VARIETIES OF WHEAT.—COMPARED ON THE BASIS OF YIELDING CAPACITY.

TABLE XXI.—*Showing Yields of Chief Varieties of Wheat Grown in 1916.*

Variety.	Area. Acres.	Highest		Lowest		Average		Mean
		Acres.	Bush. lbs.	Acres.	Bush. lbs.	Acres.	Bush. lbs.	Acres.
Gluyas	35.371	33	6	23	29	30	25	31 48
Late Gluyas	24.559	28	37	28	5	28	32	26 11
King's White	159.845	34	45	23	4	26	52	24 20
Queen Fan	10.627	22	39	20	48	21	32	22 21
King's Red	61.186	30	28	16	47	20	4	19 14
Caliph	5.460	19	39	15	2	17	50	27 4
Basil	10.192	22	34	15	18	16	2	22 16
College Eclipse	4.396	15	34	15	34	15	34	17 52

TABLE XXII.—Showing 1916 Yields of Latest Strains of College Hand-selected, Pedigree Wheats, Comparatively with those Obtained from Earlier Strains in Previous Seasons.

Variety.	Selection.	YIELDS PER ACRE.							
		1916.		1915.		1914.		1913.	
		Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Queen Fan	7	22	32	11	40	—	—	9	55
Federation	8	29	30	8	13	—	—	6	22
Jonathan	8	35	49	6	21	—	—	6	16
King's White	11	14	30	16	43	15	46	8	30
Marshall's No. 38 ..	9	28	15	9	46	—	—	9	39
King's Red	11	19	4	10	42	10	21	8	39
Beardless Gluyas ..	11	16	32	10	38	11	15	8	31
Caliph	1	19	39	20	50	10	12	6	53
Gluyas	11	13	37	18	29	13	5	10	56
Late Gluyas	11	13	4	13	36	7	21	7	16
Canaan	4	20	45	11	5	—	—	10	23
Carmichael's Eclipse.	9	16	27	7	48	7	13	7	55
College Eclipse	9	19	51	7	22	8	0	10	33
Daphne	4	18	43	18	36	—	—	7	19
Yandilla King	5	34	28	6	21	—	—	6	4
Anvil	4	23	16	8	35	—	—	5	22
Burdle	4	23	31	9	56	—	—	12	31
Cad	5	31	32	6	48	5	47	—	—
Editor	3	16	51	12	20	—	—	14	40
Basil	3	22	34	11	2	5	9	10	19
Le Huguenot	6	16	27	23	37	—	—	6	21
College Comeback ..	9	16	26	8	56	5	12	7	19
Fancy	4	17	24	17	38	—	—	8	8
Cadet	5	30	27	3	49	5	19	—	—
Beardless King	7	21	54	14	52	—	—	6	14

Variety.	Selection.	Means.			
		1911.	1910.	1909.	1908.
		Bush.	lbs.	Bush.	lbs.
Queen Fan	7	22	35	34	48
Federation	8	11	52	25	48
Jonathan	8	10	26	24	1
King's White	11	17	0	23	27
Marshall's No. 38 ..	9	7	37	26	38
King's Red	11	12	37	22	43
Beardless Gluyas ..	11	14	38	20	51
Caliph	1	—	—	—	—
Gluyas	11	8	34	21	29
Late Gluyas	11	14	4	22	50
Canaan	4	—	—	—	—
Carmichael's Eclipse.	9	26	53	28	21
College Eclipse	9	12	27	25	8
Daphne	4	—	—	—	—
Yandilla King	5	—	—	—	—
Anvil	4	—	—	—	—
Burdle	4	—	—	—	—
Cad	5	—	—	—	—
Editor	3	—	—	—	—
Basil	3	—	—	—	—
Le Huguenot	6	—	—	—	—
College Comeback ..	9	8	4	29	12
Fancy	4	—	—	—	—
Cadet	5	—	—	—	—
Beardless King	7	—	—	—	—

In the above tables are shown the yields of certain varieties regularly grown here as farm crops, and also returns obtained from small areas of the latest selections of a larger number. Referring to what may be regarded as bulk crop averages, it will be noted that the records cover two seasons only; but so far as they have gone, the early types, notably Gluyas, Late Gluyas, and King's White stand out as being the most prolific grain-bearing varieties in the district, notwithstanding the fact that they are too weak in the straw to stand up against spring and summer gales. College Eclipse, which is also an early variety, is usually to be depended upon for a moderate yield under dry conditions, and on that account is always worth a place in the cropping programme; but in good years it generally falls a little behind the other early wheats grown here. Of the mid-season wheats, Queen Fan, one of Mr. Spafford's valuable productions and an erect grower suitable for hay or grain, has averaged only 2 bush. less than King's White; whilst Caliph and Basil, which ripen about the same time, and were originated by the same plant breeder, have proved very little inferior to it.

Turning to Table XXII., we note that the mean figures for a series of years do not altogether confirm the view expressed above in favor of early wheats. However, it must be recognised that in dealing with plots that rarely attain to an acre, any losses sustained through difficult harvests or other causes will usually affect seriously the calculated yield per acre, and as the early quick-growing types are relatively weaker in the straw, they are the ones most apt to suffer from accidents of this character.

Nevertheless, even in this record of yields, we observe that although three mid-season varieties—Queen Fan, Federation, and Jonathan—lead the way, the wheats that are known to do best in the field come well up on the list. After years of high winds and driving rains such as 1916, there frequently arises a demand for wheats that are stiff in the straw and not prone to go down. And this trend towards rigid types is born of a desire to escape the vexations of a prolonged harvest amongst badly laid crops. It would be prudent, however, for those who are inclined to fly off at a tangent from the old established varieties that have established a claim to be ranked amongst the best bag-filling wheats under our conditions, to ponder seriously over the foolishness of fashioning their system of cropping on the results of a season that is admitted to have been without a parallel in the last 25 years. It is not reasonable to expect wheats that are characterised by extremely rapid growth and capacity to yield plenty of grain, to produce straw that is as strong and tough in the fibre as the slower growing mid-season and late wheats; but since, in a normal season, we must always expect to find in a district like this that the best returns will be derived from early wheats; and since it is obvious that farm practice should be founded on average conditions, no

satisfactory reason can be advanced in support of the inclination to depart from the existing system which relies mainly on the successful culture of early acclimatised and well-proven types, such as Gluyas and King's Early.

TABLE XXIII.—*Showing Yields of some new College Crossbred Wheats (1910 to 1912 Crossees).*

Variety.	Selection.	Pedigree.	1916.	1915.	1914.	Means.
			B. lbs.	B. lbs.	B. lbs.	B. lbs.
Eureka . . .	3	Fan and Red Fife x Jona (1910)	17 49	8 28	4 23	10 13
Exquisite . .	1	Gluyas x Indian Runner x Gluyas (1910)	18 28	2 41	35 36	18 55
Ewer	1	Carmichael's Eclipse x Indian Runner x Carmichael's Eclipse (1910)	31 46	3 17	10 46	15 16
Evening . .	3	Gluyas x Indian Runner x Jona (1910)	29 27	23 5	—	26 16
Echo	3	Bearded Rieti x Gluyas x Jonathan (1910)	10 57	5 11	—	8 4
Fortune . .	2	Marshall's No. 3 x Indian Runner x Marshall's No. 3A x Jona (1911)	38 43	—	—	—
Fane	2	Marshall's No. 3 x Indian Runner x Marshall's No. 3A x Queen Fan (1911)	30 43	—	—	—
Forge	2	Carmichael's Eclipse x Crossbred 53 (1911)	29 8	—	—	—
Ford	2	Fan x Comeback x Crossbred 53 (1911)	22 3	—	—	—
Flamen . .	2	Collego Eclipse x Indian Runner x Mar. shall's No. 3A x Queen Fan (1911)	15 9	—	—	—
Fort	1	Bearded Rieti x Gluyas x Jonathan (1912)	14 42	—	—	—

TABLE XXIV.—*Showing Yields of Miscellaneous Wheats Grown in Field No. 6A, 1916.*

Variety.	Selection.	Acres.	Yield per Acre.
			Bush. lbs.
Crossbred 53	1	0.066	35 21
Yandilla King	4	1.824	31 48
Turretfield Eclipse	—	0.713	34 19
Federation	7	0.912	33 35
American No. 8	—	0.896	33 28
Correll's No. 7	—	0.431	28 2
Onas	—	0.640	23 12

GENERAL WHEAT AVERAGE.

For the fifth time since 1904, the wheat average on the College Farm has exceeded 20bush. to the acre. At one stage in the harvest it looked as though we should eclipse all previous records this season, but the disappointing return of 16bush, 47lbs. from 44½ acres in Daly's A upset our calculations. We find, however, that notwithstanding the depressing influence of this relatively low yield the average for the year 1916 works out at 24bush, 44lbs., which is only 21lbs. per acre below the 1909 record. The whole of the wheat crop in 1909 was grown after bare fallow, but on account of the unfavorable conditions in 1915, it was impossible to plough up an adequate area of fallow, and hence, in 1916, we find 70 odd acres of wheat sown after autumn ploughing. If we compare the average yields from wheat grown on the bare fallow, wheat rotation in the seasons 1906 and 1916, we find that the figures work out at

25bush. 5lbs. and 25bush. 57lbs. respectively. In the appended table, however, no distinctions of this kind are recognised, the whole area under wheat, exclusive of plots under one acre in area, being taken into account. It would not be difficult to improve upon the mean yield of 17bush. 50lbs. obtained over the past 13 years if we were to concern ourselves solely with the best yielding varieties and ignore the demands for seed wheat of other kinds that yield better elsewhere than they do under Roseworthy College conditions. This, however, would prevent the place from fulfilling one of its most important functions as the State Agricultural College, and hence we accept the general farm average as an indication of the wheat-growing capacity of the farm; but whilst so doing we are fully cognisant of the fact that the figures are below rather than above the average return that should be obtained in the district.

TABLE XXV.—*Showing the Average Yields of Wheat on the College Farm, 1904 to 1916.*

Season.	Rainfall.		Area under Wheat, Acres.	Average Yield per Acre, Bush. lbs.
	"Useful," Inches.	Total. Inches.		
1904	11.60	14.70	.. 330.00	.. 18 3
1905	14.23	16.71	.. 212.00	.. 24 11
1906	16.31	19.73	.. 318.00	.. 14 20
1907	13.96	15.13	.. 178.00	.. 13 20
1908	15.52	17.75	.. 258.52	.. 22 14
1909	21.15	24.05	.. 318.47	.. 25 5
1910	16.79	23.87	.. 267.35	.. 16 38
1911	9.45	13.68	.. 234.98	.. 14 17
1912	13.05	14.97	.. 232.89	.. 19 36
1913	10.82	15.66	.. 333.07	.. 6 32
1914	6.12	9.36	.. 148.69	.. 11 28
1915	18.33	19.76	.. 367.271	.. 21 13
1916	20.25	23.23	.. 330.937	.. 24 44
Means for 13 years	17.58	14.55	.. —	.. 17 50

In conclusion, I wish to record the energetic interest shown in the conduct of the harvest, and the assistance rendered me in the compilation of this report by the Assistant Experimentalist (Mr. R. C. Scott) and the Farm Superintendent (Mr. E. L. Orchard).

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board took place on Wednesday, February 14th, there being present Messrs. F. Coleman (chair), G. Jeffrey, G. R. Laffer, M.P., T. H. Williams, W. J. Colebatch, B.V.Sc., M.R.C.V.S., J. Miller, A. M. Dawkins, C. J. Tuckwell, Professor Perkins, and the Acting Secretary (Mr. H. J. Finnis).

CONFERENCE OF BUTTER FACTORY MANAGERS.

It was reported that the Minister of Agriculture had approved of the Board's suggestion that a conference of representatives of dairy factories should be held, and had agreed to provide rail tickets to enable the delegates to attend.

ADELAIDE-WEST COAST TRANSIT FACILITIES.

Further consideration was given the question of providing for the through booking of goods from rail stations on the mainland to stations on the Eyre Peninsula railway and vice versa. Information was received from the Railways Commissioners of Tasmania and New Zealand in relation to the practices adopted under somewhat similar conditions, and after discussion it was decided, on the motion of Mr. Laffer, seconded by Mr. Tuckwell, to direct the attention of the Minister of Agriculture to the arrangements prevailing in the countries referred to, and point out that the Board was of the opinion that if somewhat similar arrangements to one or other could be brought into operation in South Australia, it would be of considerable benefit to the West Coast and other parts.

AGRICULTURAL EDUCATION FOR WOMEN.

Communications were received from the Naracoorte and Sherlock Branches dealing with the admission of women to the membership of Branches. The former asked whether they could nominate a woman as a member of their Branch, and the latter expressed the opinion that "women should be allowed to join all Branches on the same footing as men, Branches to be allowed to make their own arrangements as to when joint or separate meetings should be held." The Board was unable to approve of the admission of women to Branches of the Bureau.

A committee, consisting of the Director of Agriculture, Mr. Laffer, and the Secretary, was appointed to draft and submit to the next meeting of the Board a scheme for the inauguration of women's country clubs.

PROTECTION OF ROADS.

It was decided to procure from Branches an expression of opinion on various suggestions that had been made in connection with affording more effective protection for roads in country districts, more especially with the idea of limiting the destructive influences of heavy loading. Present legislation (District Councils Act, 1915, section XXII., sub-sections XIX., XX.) empowers district councils to enforce by laws to regulate, control, or prohibit the passing or travelling in or along the streets and roads of all or any vehicles, and to fix the route by which vehicles shall travel, and to fix the weight of load to be carried. The suggestion has been made, that instead of the regulation of this matter being left in the hands of the district councils, representations should be made to the Government to introduce legislation determining a maximum load to be carried over country roads during the Months of May, June, July, and August at, say, 8 tons gross, and for the remainder of the year, a maximum gross load of, say, 12 tons. With the object of enforcing this provision, it has been suggested that all weighbridges should be licensed, and inspected from time to time. For each load weighed over these, cartnotes should be issued, and a correct counterpart of the note retained by the bridge attendant. An intimation of overloading on this note could be taken as sufficient evidence to convict on a charge of overloading the vehicle in question.

The Width of Tires Act, 1868-9, sets out that no person shall take over a road a load of greater weight than 9cwts. for each inch of width of bearing surface of each wheel. This provision takes no account of the fact that a load of given weight on a (say) 3ft. wheel is very much more destructive from the road point of view than a similar load on a (say) 5ft. wheel of the same width of face. It has been suggested that the Government might be requested to amend existing legislation so as to embody the necessary mechanical principles governing the relation of the diameter of the wheel to the width of face of tire.

The suggestion has also been made that the Government should classify the main road according to traffic, and allocate the main roads grant on the basis of this classification.

PROTECTION OF PURCHASERS OF NURSERY STOCK.

A Conference resolution was received to the effect that it was desirable that legislation should be enacted to protect purchasers of fruit trees, by making it obligatory for nurserymen to state the class of stock on which varieties were worked. The Board decided that without further evidence of the necessity for protection, it saw no need for the suggested legislation.

SOLDIERS' FUND.

The 1916 Congress decided that Branches should be asked to secure from members donations of crops, etc., to the South Australian Soldiers' Fund. Whyte-Yareowie and Ororoo Branches wrote suggesting that the scope of the resolution might be widened to permit Branches to collect from farmers who were not members of the Bureau. The Board approved the request.

THE BUREAU AND THE WAR.

From Ironbank came a request that the Branch there might be permitted to go into recess until the termination of the war, as the majority of the members were on active service, and the Hon. Secretary (Mr. J. R. Coates) was leaving by the next transport. The Board readily assented, and expressed its high appreciation of the manner in which the Branch has responded to the call of Empire.

NEW MEMBERS.

To the rolls of existing Branches the names of 58 new members were added.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on March 1st:—

BUTTER.—Exceptionally cool weather ruled during the month of February, and consequently the seasonable diminishing of production is not being experienced at so rapid a rate as usual. There is still a surplus of second and third qualities, but naturally not to the same extent as a month ago, and these continue to be absorbed by the London market, where values still rule at approximately equal to January rates. South Australia continues to import from the eastern States for tops, and local prices in prints at the close of the month were—"Alfa," 1s. 6½d.; "Primus," 1s. 6½d.; third grade creamery, 1s. 2½d. to 1s. 3½d.; choice separators and dairies, 1s. 4d. to 1s. 3½d.; fair quality, 1s. 2d. to 1s. 2½d.; well graded store and collectors', 1s. 1½d. to 1s. 2½d.; off conditioned lots, 1s. to 1s. 1d. per lb.

EGGS.—The market in February recovered very rapidly, and under the stimulus of brisk demand values firmed substantially, so that at the close of the month hen eggs were selling at 11½d.; duck, 1s. 0½d. per dozen.

CHEESE.—Large consignments continue to be received, but find a good outlet locally and interstate. Prices are firmer, values being from 8d. to 9d. per lb. for large to loaf.

HONEY.—Heavy quantities are coming forward, but in spite of that rates have advanced, and all prime samples are selling readily at 4d. to 4½d. per lb., although second grades are slow of sale. Beeswax very scarce at 1s. 7d. per lb.

ALMONDS.—Small lots of the new crop are now arriving, and find very brisk sale locally, whilst export buyers are enquiring for parcels. Brandis, 10d. to 10½d.; mixed soft-shells, 9d. to 9½d.; hardshells, 4½d.; kernels, 1s. 6d. to 1s. 7d. per lb.

BACON.—Supplies are short, curers finding difficulty in coping with demand, Best factory cured sides, 1s. to 1s. 1d.; hams, 1s. 2½d. to 1s. 3½d. per lb.

LIVE POULTRY.—Very active markets have taken place during the month, competition being keen for all quality birds. Turkeys are very scarce, and command high figures. Good heavy-weight table roosters, 4s. to 4s. 9d. each; nice-conditioned cockerels, 2s. 6d. to 3s. 6d.; plump hens, 2s. 4d. to 4s. 6d.; light birds, 2s. to 2s. 3d.; ducks, good, 2s. 3d. to 4s.; light sorts, 1s. 8d. to 2s. 3d.; geese, 3s. 6d. to 4s. 10d.; pigeons, 6½d. each; turkeys, from 10d. to 1s. 2½d. per lb. live weight for fair to prime table birds.

POTATOES.—Locally grown potatoes continue to be the largest factor in supplying the Adelaide market. At one point during the past month prices touched £3 per ton, and on that account many growers stopped digging, with the result that rates soon improved. **ONIONS.**—Thanks mainly to orders from Western Australia, the onion market has been kept well cleared, and although buyers for export have now ceased to operate, the possibility of a glut has been averted. Prices—Potatoes, £4 10s. to £5 per ton on rails Mile End or Port Adelaide. Onions, £6 to £6 10s. per ton on rails Mile End or Port Adelaide.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF FEBRUARY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—During the month the mornings have been very damp and cold, mist and fog hanging on the hills, like early spring weather. Thunderstorms have been very prevalent in the afternoons, with light misty showers. The majority of days were dull and cloudy. Crops—The bulk of the reaping is finished. Those who had only Federation wheat in were exceedingly fortunate, as it stood up well, and threshed easily; those who have down crops are unable to take them off, the weather being too cold and damp. Natural feed—The tuft grass has kept green throughout the summer, but the dry feed, although plentiful, is spoilt by the continual dampness. Stock is in good condition. Several horses and many sheep have died from colic caused by eating mouldy wheat in the stubble. Miscellaneous—Fallows are rather dirty. Paddy melons and other rubbish are covering them in places, being the result of summer rains.

Kybybolite.—Weather—Hot for the first half of the month, followed by cool and unusually wet conditions, the total fall ranging from 2½ in. to 2½ in. in different parts of the district. Farmers were fortunately well through their harvesting operations before this fall occurred. Crops—Harvesting operations have been completed in this immediate locality, and the general average yield is quite up to the 15 bush. forecast. Threshing operations, where carried out, have been seriously delayed by the rain. Natural Feed—A promising growth has started in the stubbles and pastures; there is also an abundance of dry feed. Stock are in fair to good condition. Pests.—Parrots are proving rather troublesome in fruit gardens.

Turretfield.—The weather during the month of February was changeable. No really hot weather was experienced, but sultry conditions prevailed, resulting in several thunderstorms. The rainfall registered was 1.39 points, but on the three days on which this total was recorded the falls were regular, so that no floods occurred. Crops—Harvesting operations have been completed, but the yields are not turning out up to the earlier expectations, owing to the proportion of crops that was tangled and broken down with the heavy weather experienced in the late spring. Hay carting is now practically finished, and farmers are busy thatching their stacks. Natural Feed—Green feed is growing fast after the recent rains, especially in the stubble where the fallen grains of wheat have been germinated. Mixed with the dry feed this green fodder is making excellent feed for stock. Stock are in fair condition. A number of cows have been lost during the month, and the symptoms point to the cause of death being dry bible. Pests—Mice, rats, sparrows, and starlings are very numerous, and farmers are at a loss to know how to protect the wheat stacks from the ravages of the mice. Miscellaneous—After the rain the cultivation of fallow land has become general, and this work is being pushed on with as fast as possible.

Veitch.—Weather—Rainfall for month of February, 260 points; Veitch average for February, 101 points. We have had very unsuitable weather conditions for harvest work, and in some cases in this district the loss of grain has been very heavy. Crops—All crops have now been stripped, and cleaning operations are being forced ahead. Natural Feed—Green feed is now showing up in stubble and scrub. Stock—All in healthy condition. Miscellaneous—Wheat carting teams are now very busy, and the Veitch wheat stacks are growing in size considerably.

COST OF PRODUCTION.

“What would it cost to produce a bushel of wheat in South Australia, with prevailing high rates of wages and cost of living, on a basis of an average yield of 12bush. to 13bush.?” inquired a correspondent. In replying, the Superintendent of Experiments (Mr. W. J. Spafford) said:—If a man with a plant as is shown below crops 250 acres on bare fallow every year, keeps no stock other than his horses, does nothing other than the work necessary to raise 12bush. to the acre of wheat, and allows himself 9s. a day for all days but Sundays, whether he is working or not, the maximum that it should cost him per bushel will be 3s. 1½d.

Plant.			
	£	s.	d.
Six horses	150	0	0
One 4-furrow plough	35	0	0
One cultivator	35	0	0
One set harrows	7	0	0
One drill	35	0	0
One harvester	80	0	0
One wagon	70	0	0
Harness	30	0	0
Extras	10	0	0

£452 0 0

Above plant should cultivate 250 acres.

	£	s.	d.
Ten per cent. depreciation	45	4	0
Hay, 30 tons at £1	30	0	0
Repairs, shares, etc.	10	0	0
Wages, 9s. a day all the year	140	17	0
Extra wages	15	0	0
Bags at 9s. doz. (less 2-3d. per lb. as wheat)	31	19	0
Rent and taxes (5s. per acre per year, 10s.)	125	0	0
Superphosphate (½cwt. per acre), at 2s. 6d.	31	5	0
Pickling, at 3d.	3	2	6

£432 7 6

250 acres x 12bush. equals 3,000bush.; 3,000bush. — 250bush. for seed equals 2,750bush.; £432 7s. 6d. to produce 2,750bush. equals 3s. 1½d. per bushel.

To pay for the work, it would cost something like the following:—

250 acres yielding 12bush. per acre.			
	£	s.	d.
Ploughing, at 5s.	62	10	0
Cultivating twice at 2s. 6d., 5s.	62	10	0
Harrowing four times, at 9d., 3s.	37	10	0
Drilling, 1s. 6d.	18	15	0
Seed (1bush. per acre), 4s.	50	0	0
Super. (½cwt. per acre), 2s. 6d.	31	5	0
Pickling (250bush.), at 3d.	3	2	6
Harvesting (bags sown), 3s.	37	10	0
Rent and taxes (5s. for two years), 10s.	125	0	0
Bags (less 2-3d. lb. as wheat), 9s. doz.	31	19	0
Cartage, at 4d. per bag	16	13	4

£476 14 10

£476 14s. 10d. to produce 3,000 bushels equals 3s. 2d. per bushel.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF UPPER EYRE'S PENINSULA BRANCHES.

Representatives of the Upper Eyre's Peninsula Branches of the Agricultural Bureau met in Conference at Cowell, on Tuesday, February 27th. In addition to the delegates mentioned hereunder, the Director of Agriculture (Professor Arthur J. Perkins), the Dairy Expert (Mr. P. H. Suter), Messrs. A. M. Dawkins (member), and H. J. Finnis (Acting Secretary) of the Advisory Board of Agriculture attended.

The chair was occupied by Mr. A. O. Dawkins (Chairman of the Elbow Hill Branch). The delegates were:—Elbow Hill Branch—J. C. Busch, A. R. S. Ramsay, G. F. Wake, G. C. Dunn, R. S. Mills, H. J. Wheeler; Salt Creek—J. Abrook, W. Lee, sen., W. Lee, jun., D. A. Venning; Yabmana—J. F. Robertson, H. P. McCallum, G. W. Storey; Yadarrie—A. I. R. Cain, J. J. Deer; Miltalie—W. G. Smith, L. S. Aunger, E. Story, T. J. P. McEachern; Mangalo—J. H. Cleave.

OPENING ADDRESS.

Mr. A. M. Dawkins, in declaring the Conference open, said the interchange of experience secured by Conferences of that nature, were a means of improving the knowledge of agricultural matters. Experience was a good school, but the tuition was hard, and if they could benefit from the experience of others they would do well. It had been stated that Australia had no system of farming. He held the opinion that the sooner they got down to a system that would work out to be the most productive for the farmer the better. The general practice in his district was to keep sheep and crop once in three years—the system was feed, fallow, wheat. If they were going to rest their land it would be necessary for them to keep some stock, and the keeping of sheep and breeding of lambs fitted in with the wheat growing. At times the sheep would bring in nearly as much as would have been secured had the land been under crop. The system improved the fertility of the land, and a greater average return was secured from the area put under wheat.

He expressed the hope that they would have a successful and profitable gathering, and declared the Conference open.

HEAVY OR LIGHT DRESSINGS OF SUPER.

Mr. H. P. McCallum, of the Yabmana Branch, contributed a paper under this title. When farmers were puzzled to know what quantity of super, to apply to the land, the difficulty could be overcome, he said, by experiment, carried over three or four seasons. On large holdings he advised large plots. Very often the immediate gain to the farmer from heavy dressings was slight, but the extra expense was more than compensated for by the extra stock that could be carried. Where the

bare fallow-wheat system was adopted, it was not necessary to apply heavy dressings unless in a district with a heavy rainfall; 60lbs. per acre was sufficient in that locality. Where the land was cropped every three years 100lbs. per acre would pay handsomely, he said, for although there might not be an immediate return from the wheat, a good crop of feed could be relied upon generally.

The paper was followed by a discussion on the questions raised.

ROTATION OF CROPS.

"To enable us to get the best results from our land, it is necessary for us to adopt a system of rotation, more especially where takeall is troublesome," said Mr. J. J. Deer, of the Yabman Branch, in a paper on rotation cropping. Although not a sure means of prevention, he continued, oats had proved very useful in checking the disease. Land which had been fallowed should be sown with wheat, and the following year it should be drilled with oats, and the third year it should be left out for grazing. The fourth year it should be refallowed, and in subsequent years receive similar treatment in rotation as outlined above. The general adoption of that practice would mean a very large annual production of oats, and it would be necessary to make profitable use of them. All hay cut should be eaten, and eaten grain could be used much more extensively in place of bulkier fodders. Every farmer should carry a good supply of oats loose in a barn; a structure about 27ft. x 15ft. would hold about 600 bags, and built of stone, should cost not more than £75.

An interesting discussion followed. Mr. W. Lee, sen., agreed with the writer of the paper that to store oats in a barn was a good idea. Mr. H. P. McCallum (Yabmana) did not agree that it was workable to take off one crop of wheat in four years; one in three years would be much more satisfactory. He did not see any reason why sheep should not be fed on the oats; he had known cases of farmers who had fed sheep with oats by simply distributing the grain over the ground through the drill. Mr. W. Lee, jun. (Salt Creek) had been growing oats for some years, and he had found the crop very satisfactory.

Mr. W. Hier (Miltalie) had found oats very good for fowls and pigs, and growing that crop in rotation permitted of them being drilled in before the ordinary seeding operations began. Mr. W. G. Smith (Miltalie) advocated the growth of summer fodders.

THE DAIRY COW.

The Dairy Expert (Mr. P. H. Suter) delivered an address dealing with the treatment of the dairy cow from the time of birth. In connection with the rearing of the calf, he expressed a preference for taking the animal away from its mother after it had been cleaned, say half a day after it had been born. The calf should receive its mother's milk, at a blood temperature, three times daily. It should be kept on that for so long as the beastings were being yielded by the cow, after which it should receive whole milk. A weakened constitution would result if an attempt were made to rear the animal on inferior feed. For the first 10 days it should receive feed three times daily. At the end of a

month, by gradually reducing the proportion of whole milk, and increasing the proportion of skim milk, and adding linseed and lime water, its ration could be changed. The addition of lime water to the feed would tend to prevent scours, the occurrence of which in 99 cases out of 100 was the fault of the feeder. In feeding, cleanliness and regularity were of paramount importance.

WEANING.

At the age of five or six months the calf could, under ordinary circumstances, be weaned from its milk diet. It should be paddocked where it could find a fair living, and be kept in healthy condition. The time at which the animal should be put to the bull depended on the breed, but generally it was a wrong practice to cause heifers to be put in calf at from 12 months to 15 months. In ordinary circumstances the animal should be covered at from 15 months to 20 months, but an animal that early contracted the habit of putting on beef should be put to the bull earlier. The animal should be kept at the bucket for eight or nine months. That was of the utmost importance, because it inculcated a habit of continuous milk making.

The lecturer then dealt with the importance of providing the animals with a sufficiency of nutritious feed, and urged that it was much better to keep four animals on the farm well fed than to carry 14 that were under fed. The necessity for using a bull of proved milking ancestry was emphasized.

At the conclusion of his address Mr. Suter answered a number of questions.

NEXT CONFERENCE.

It was decided that the next gathering should take place at Cowell, during August, 1918, arrangements to be left in the hands of the Salt Creek Branch.

FREE PARLIAMENT.

TRANSIT FACILITIES.

On the motion of Mr. Anger, seconded by Mr. Hier, it was unanimously decided to support the following resolution carried at the 1916 Conference of Lower Eyre's Peninsula Branches, and extend the wording to include all ports. The resolution read as follows:—"This Conference is of the opinion that the Government should either provide for a State line of steamships to trade between West Coast ports and Port Adelaide, or make provision for the through carriage of goods from the mainland to towns on the West Coast with a through booking charge."

As an illustration as to the necessity for some such provision, it was pointed out that it cost 10s. to send a pig from Cowell to the Abattoirs.

CO-OPERATIVE FLOUR MILL.

Mr. W. Smith, of the Miltalie Branch, introduced the question of instituting a flour mill on a co-operative basis in this district. It was decided that a member of the Branch should embody its views in the form of a paper, and after the Branches concerned had had the opportunity of considering the proposals, the question could be further discussed at the next Conference.

WHARFAGE RATES.

On the motion of Mr. Anger, seconded by Mr. Lee, it was decided to urge the Advisory Board to request the Harbors Board to give to all ports in South Australia the same rates of wharfage and equal facilities to those ruling on the River Murray. The rates and facilities referred to were as follows:—Jetty tolls or wharfage on milk, cream, and small parcels—On every 5-gall. can of milk and cream, 1d.; on every 10-gall. can of milk or cream, 2d.; on every parcel weighing 14lbs. or under, 1d. The wharfage thus payable on milk and cream cans covered the inward and outward dues on shipping, landing, and return. Payment of tolls was made by the owner affixing to the package a jetty toll stamp.

Proceedings were terminated with an address by the Director of Agriculture (Professor Arthur J. Perkins). This will be published in a subsequent issue.

FRUIT-GROWING ON THE MURRAY.

A prospective settler on the irrigation areas of Berri or Cobdogla has submitted the following questions:—(1) What kind of fruit trees do you advise planting? (2) how many acres of each variety? (3) do you think 20 acres too much for one man with limited capital?

(1) The fruits promising best just at present as being most suitable for this project are orange, apricot, peach, almond, sultana, fig, and lemon, according to the soil and situation of block, says Mr. Quinn, the Horticultural Instructor.

(2) Without a personal knowledge of the last named factors one cannot advise which will be the most suitable and what area is likely to prove available for each. If the soil and situation be appropriate, I consider the orange has the best prospects, and would put in more of that fruit than of any other of the sorts named.

In regard to question 3, Mr. Quinn states that 20 acres is rather much for a man with limited capital. Of course it all depends on what may be called limited. To bring a block of 20 acres into good bearing will involve the command probably of £1,000 spread over four or five years, and then perhaps the owner may need to go out to earn money during a portion of the time whilst waiting.

The question of planting to secure an early return involves more than is apparent on the surface. There is no market of any consequence within reach of Berri or Cobdogla for small quick bearing fruits, and little for vegetable crops. The returns from such crops as potatoes, tomatoes, and onions are very precarious under the collective system of irrigation followed on the Murray, which is designed to meet the needs of fruit trees and grape vines only. A man with command of £500 to £600 capital would do better to select a block of 10 to 15 acres, if obtainable, and then he will have to work very hard and live economically to make a success of the venture.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of February, 1917, also the average precipitation to the end of February, and the average annual rainfall.

Station.	For Feb., 1917.	To end Feb., 1917.	A'v'ge. to end Feb.	A'v'ge. Annual Rainfall	Station.	For Feb., 1917.	To end Feb., 1917.	A'v'ge. to end Feb.	A'v'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta	0.74	2.80	0.78	4.76	Gulnare	1.32	2.48	0.60	19.74
Warrina	0.81	2.10	—	—	Bundalcer W. Wks.	0.58	1.91	0.58	17.29
Tareoola	1.63	3.79	0.55	7.58	Yacka	1.23	2.21	0.55	15.27
Herzogg	1.30	2.36	0.48	6.04	Koolunga	1.91	3.03	0.65	15.94
Farina	1.83	2.87	0.56	6.70	Snowtown	1.94	2.74	0.43	15.70
Leigh's Creek	2.77	4.59	0.50	8.66	Brinkworth	1.09	2.36	0.60	15.48
Beltana	2.66	5.16	0.71	9.22	Blyth	1.37	2.29	0.55	16.34
Blinman	1.66	3.68	0.78	12.83	Clare	1.63	2.89	0.78	24.30
Hookina	2.01	0.81	—	—	Mintaro Central	1.76	3.09	0.68	21.99
Hawker	2.32	6.77	0.48	12.22	Watervale	1.78	3.55	0.71	27.17
Wilson	0.93	4.47	0.61	11.78	Auburn	1.68	3.32	0.79	24.25
Gordon	1.79	6.92	0.47	10.26	Hoyleton	1.26	2.78	0.48	17.96
Quorn	0.87	4.11	0.47	13.78	Balaklava	1.97	2.46	0.47	16.60
Port Augusta	0.69	2.48	0.46	9.46	Port Wakefield	2.22	3.79	0.57	13.13
Port Augusta W.	0.68	2.65	0.38	9.36	Terowie	1.49	4.39	0.75	13.71
Bruce	0.64	3.91	0.52	10.01	Yarowie	2.20	4.84	0.56	13.91
Hammond	2.96	5.85	0.49	11.46	Hallett	0.81	2.12	0.55	16.40
Wilmington	0.60	3.99	0.52	18.26	Mount Bryan	0.89	2.01	0.72	15.79
Willowie	1.73	5.13	0.54	11.90	Burra	0.97	1.65	0.64	17.82
Melrose	0.66	4.83	0.82	23.03	Farrell's Flat	0.87	1.37	0.60	18.87
Hookeroo Centre	1.34	4.67	0.53	15.84	WEST OF MURRAY RANGE.				
Port Germein	1.04	2.89	0.41	12.84	Manoora	1.51	2.67	0.52	16.09
Wirrabara	1.03	3.68	0.60	18.91	Saddleworth	1.17	2.48	0.67	15.69
Appila	1.61	3.87	0.64	15.08	Marrabel	0.88	2.06	0.50	18.94
Cradoek	1.54	5.57	0.63	10.86	Riverton	1.84	3.72	0.60	20.48
Carrieton	2.40	6.30	0.44	12.22	Tarlee	1.71	2.22	0.55	17.48
Johnburg	1.85	5.27	0.42	10.21	Stockport	1.09	1.54	0.45	15.89
Eurelia	2.00	6.27	0.48	13.24	Hamley Bridge	1.37	1.91	0.52	16.45
Orroroo	2.30	5.97	0.56	13.42	Kapunda	1.00	1.75	0.65	19.67
Black Rock	2.30	5.76	0.53	12.25	Freeling	1.10	1.60	0.57	17.83
Petersburg	3.05	6.43	0.51	13.07	Greenock	1.28	1.88	0.64	21.46
Yongala	2.30	5.82	0.58	13.94	Truro	1.10	2.04	0.62	19.74
NORTH-EAST.					Stockwell	1.24	2.02	0.62	20.30
Ucoila	3.01	5.73	—	—	Nuriootpa	0.94	1.79	0.61	21.25
Nackara	2.47	6.47	—	—	Angaston	1.21	2.06	0.64	22.25
Yunta	2.75	6.17	0.45	8.22	Tanunda	1.43	1.77	0.64	22.28
Waukarunga	2.25	4.92	0.40	7.94	Lyndoch	1.24	1.92	0.64	23.01
Mannahill	1.69	4.20	0.52	8.46	Williamstown	1.98	2.62	—	—
Cookburn	3.35	5.89	0.54	7.97	ADELAIDE PLAINS.				
Broken Hill, NSW	3.22	6.76	0.82	9.63	Mallala	1.72	2.27	0.49	16.58
LOWER NORTH.					Roseworthy	1.41	2.17	0.50	17.31
Port Pirie	1.23	3.06	0.42	13.21	Gawler	1.95	2.73	0.65	19.21
Port Broughton	1.14	1.71	0.46	14.33	Two Wells	1.56	2.01	0.45	16.58
Bute	1.84	2.44	0.39	15.42	Virginia	1.99	2.41	0.49	17.38
Laura	1.48	3.17	0.61	18.22	Smithfield	2.30	2.91	0.62	19.30
Caltowie	0.90	2.54	0.63	17.27	Salisbury	2.34	2.76	0.58	19.57
James town	0.96	2.59	0.80	17.46	North Adelaide	2.77	3.26	0.51	21.46
Gladstone	1.51	2.91	0.54	16.00	Adelaide	2.40	2.84	0.62	21.44
Crystal Brook	0.62	1.98	0.55	15.62	Brighton	3.16	3.50	0.71	—
Georgetown	1.53	3.33	0.67	18.32	Glenelg	2.81	3.19	0.55	19.93
Narriady	0.85	1.96	0.57	16.79	Magill	2.63	3.11	0.70	19.93
Redhill	0.90	2.76	0.59	16.79	Glen Osmond	2.76	3.28	0.42	25.26
Spalding	0.71	1.85	0.73	20.25	Mitcham	2.51	2.96	0.54	23.47
					Belair	2.77	3.27	0.64	28.64

RAINFALL—continued.

Station.	For Feb., 1917.	To end Feb., 1917.	Av'ge. to end Feb.	Av'ge. Annual Rainfall	Station.	For Feb., 1917.	To end Feb., 1917.	Av'ge. to end Feb.	Av'ge. Annual Rainfall
MOUNT LOFTY RANGES.					WEST OF SPENCER'S GULF—continued.				
Teatree Gully....	2.26	2.72	0.82	23.19	Port Lincoln	1.09	1.75	0.50	19.88
Stirling West	3.10	4.16	0.99	46.70	Tumby Bay	2.16	2.51	0.47	15.00
Crusilla	2.71	3.65	0.94	44.35	Carrow	3.71	4.40	—	—
Clarendon	3.27	3.73	0.76	33.67	Arno Bay	1.49	2.19	—	—
Morpbett Vale	3.07	3.32	0.61	23.32	Cowell	1.70	2.85	0.40	11.76
Naschunga	3.74	4.01	0.56	20.28	Point Lowly....	1.81	3.50	0.68	12.21
Willunga	3.98	4.34	0.71	25.98	Hummock Hill ..	1.98	4.22	—	—
Albion	4.25	4.41	0.55	20.34					
Myponga.....	4.53	4.87	—	—	YORKE'S PENINSULA.				
Normanville	3.76	4.07	0.58	20.65	Wallaroo.....	1.66	2.01	0.39	14.05
Yankadilla.....	4.17	4.38	0.63	22.78	Kadina.....	1.50	1.79	0.37	15.88
Cape Jervis	2.94	3.04	0.47	16.34	Moonta.....	2.57	2.81	0.38	16.22
Mount Pleasant ..	1.46	2.15	0.72	26.87	Green's Plains ..	1.73	2.18	0.34	15.73
Blumberg	2.12	2.61	0.65	29.38	Maitland	2.73	3.25	0.40	20.08
Gumeracha	2.89	3.51	0.74	33.30	Ardrossan	1.90	2.32	0.36	13.89
Millbrook Reservr.	2.21	2.85	—	—	Port Victoria ..	3.09	3.42	0.53	15.21
Lothel	1.99	2.59	0.76	35.38	Curramulka.....	3.72	4.09	0.36	18.50
Woodside	2.18	2.74	0.82	31.87	Mirlaton	3.56	3.79	0.36	17.41
Hahndorf	1.70	1.98	0.76	35.45	Stansbury	3.72	3.83	0.35	17.06
Nairne	2.03	2.55	0.87	28.83	Warooka	4.70	4.98	0.43	17.71
Mount Barker	2.29	2.91	0.89	30.93	Yorktown	3.35	3.47	0.36	17.47
Echunga	2.21	2.85	0.77	32.83	Edinburgh	3.10	3.27	0.42	16.48
Maclesfield	2.11	2.78	0.74	30.72	Port Vincent	3.60	3.89	—	—
Shadows	2.28	3.04	0.78	35.52					
Strathalbyn	1.44	1.90	0.69	19.28	SOUTH AND SOUTH-EAST.				
MURRAY FLATS AND VALLEY.					Cape Borda	1.51	1.82	0.56	25.09
Wellington	1.17	1.54	0.50	15.01	Kingscote	3.86	4.16	0.44	18.85
Willing	1.24	1.56	0.54	16.08	Penneshaw	2.74	2.89	0.55	21.34
Langhorne's Bridge	1.28	1.66	0.47	15.27	Cape Willoughby..	2.88	3.12	0.57	19.69
Taslem Bend	2.00	2.96	—	—	Victor Harbor ..	3.11	3.69	0.66	22.18
Murray Bridge ..	1.00	1.37	0.50	14.32	Port Elliot	3.05	3.36	0.66	20.33
Collingwood	1.48	1.87	0.56	15.65	Goobwa	2.42	2.77	0.60	17.93
Yannam	0.67	1.35	0.41	11.67	Pinnaroo	0.96	1.62	1.19	16.74
Falmer	1.04	1.54	0.66	15.60	Parilla	0.76	1.58	—	—
Sedan	2.21	3.03	0.44	11.92	Lameroo	0.58	1.51	0.71	16.55
Sean Reach	1.43	1.87	—	—	Parrakie	1.12	1.57	—	—
Blanchetown	0.35	0.67	0.53	—	Geranium	0.95	1.34	—	—
Endianda	0.97	1.47	0.55	10.71	Peake	1.42	2.05	—	—
Sutherland	0.91	1.35	0.43	17.33	Cooke's Plains ..	2.35	2.69	0.42	14.74
Morgan	0.55	0.97	0.44	10.60	Meningie	2.57	2.85	—	—
Waikorie	2.00	2.55	—	9.29	Commandook	1.85	2.24	—	17.49
Overland Corner ..	2.67	2.97	0.58	11.42	Coonalpyn	2.05	2.38	0.48	16.80
Renmark	3.86	4.40	0.61	10.93	Tintinara	0.91	1.32	0.71	18.78
Lexton	4.59	5.64	—	—	Keith	2.19	2.54	—	—
WEST OF SPENCER'S GULF.					Bordertown	2.18	3.06	0.53	19.76
Eacla	0.28	0.75	0.57	10.13	Wolsley	1.35	1.75	0.43	17.72
White Well	0.29	1.61	0.55	9.67	Frances	1.60	2.38	0.61	20.74
Fowler's Bay	0.57	1.32	0.46	12.11	Naracoorte	1.52	2.16	0.64	22.60
Penong	0.54	1.52	0.84	11.93	Penola	1.56	2.01	0.80	26.78
Murst Bay	0.41	1.72	—	—	Lucindale	0.84	1.51	0.56	23.32
Smoky Bay	0.13	1.26	—	—	Kingston	1.60	2.00	0.61	24.73
Peina	0.20	1.82	—	—	Robe	1.45	2.02	0.65	24.69
Smoky Bay	0.42	1.47	0.51	15.31	Beachport	2.27	2.60	0.80	27.51
Tella	0.91	2.42	—	—	Millicent	0.96	1.36	0.88	29.25
Port Elliot	0.97	1.62	0.47	16.49	Kalangadoo	1.62	2.19	—	32.00
Cammins	1.76	2.18	—	—	Mount Gambier ..	1.64	2.10	1.02	26.63
					C. Nrhumberland ..	1.01	1.29	0.89	18.87

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Mar.	Apr.			Mar.	Apr.
Amyton	*	—	—	Forster	*	—	—
Angaston	664	—	—	Frances	†	—	—
Appila-Yarrowie	*	—	—	Freeling	*	8	5
Arden Vale & Wyacca	*	—	—	Gawler River	†	—	—
Arthurton	*	—	—	Georgetown	*	—	—
Balaklava	*	10	14	Geranium	*	31	26
Beaufort	*	—	—	Gladstone	*	—	—
Beetaloo Valley	*	—	—	Glencoe	*	—	—
Belalie North	*	—	—	Glenscope	*	—	—
Berri	*	7	4	Goode	*	—	—
Blackheath	676	3	7	Green Patch	*	—	—
Blackwood	*	19	16	Gumeracha	*	—	—
Blyth	*	10	14	Halidon	*	—	—
Bookpurnong East	672	—	—	Hartley	*	7	4
Boooleroo Centre	*	9	6	Hawker	*	6	10
Borrika	*	—	—	Hilltown	*	—	—
Bowhill	*	—	—	Hookina	†	6	3
Brentwood	*	8	5	Inman Valley	672	8	5
Brinkley	*	—	—	Ironbank	*	—	—
Bundaleer Springs	*	—	—	Julia	*	—	—
Burra	*	—	—	Kadina	*	10	14
Bute	*	—	—	Kalangadoo	†	3	7
Butler	*	—	—	Kanmantoo	*	—	—
Caltowie	*	—	—	Keith	*	—	—
Canowie Belt	*	—	—	Ki Ki	*	—	—
Carrieton	*	—	—	Kingscote	*	—	—
Carrow	*	—	—	Kingston-on-Murray	*	—	—
Cherry Gardens	676	6	3	Kongorong	677	6	3
Cianfield	*	—	—	Koonibba	*	6	3
Clare	*	5	2	Koppio	667	—	—
Clarendon	*	—	—	Kybybolite	*	8	5
Claypan Bore	*	—	—	Lameroo	*	—	—
Colton	*	—	—	Laura	*	—	—
Coomandook	*	—	—	Leighton	*	—	—
Coomooroo	*	—	—	Lone Pine	666	6	3
Coonalpin	*	—	—	Longwood	676	10	—
Coonawarra	*	—	—	Loxton	*	—	—
Coursbie	*	—	—	Lucindale	*	—	—
Craddock	*	—	—	Lyndoch	*	—	—
Crystal Brook	†	—	—	MacGillivray	*	—	—
Cummins	*	10	7	Maitland	*	—	—
Cygnat River	672	8	5	Mallala	*	12	9
Davenport	*	—	—	Mangalo	*	—	—
Dawson	*	—	—	Mantung	*	—	—
Denial Bay	*	—	—	Meadows South	*	6	3
Dowlingville	*	—	—	Meningie	*	—	—
Edillilie	*	—	—	Milang	†	13	10
Elbow Hill	*	—	—	Millicent	†	8	7
Eurelia	*	—	—	Miltalie	*	5	2
Forest Range	*	—	—	Mindarie	*	—	—

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Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Mar.	Apr.			Mar.	Apr.
Minlaton	*	9	6	Port Pirie	*	3	7
Minnipa	667	10	7	Quorn	*	3	7
Mintaro	*	3	7	Ramco	†	12	2
Mitchell	*	—	—	Redhill	*	6	3
Monarto South	672	10	—	Renmark	667	—	—
Montaith	*	—	—	Riverton	†	—	—
Moomba	*	—	—	Roberts and Verran ..	†	—	—
Moorlands	*	—	—	Rosenthal	†	—	—
Morchard	662	3	7	Roxy Pine	*	—	—
Morgan	*	—	—	Saddleworth	†	—	—
Murphett Vale	*	—	—	Salisbury	—	—	—
Mount Barker	673	7	4	Salt Creek	*	—	—
Mount Bryan	*	—	—	Sandalwood	*	—	—
Mount Bryan East ..	*	—	—	Sherlock	*	—	—
Mount Compass	†	—	—	Spalding	*	—	—
Mount Gambier	*	—	—	Stirling's Well	*	—	—
Mount Hope	*	—	—	Stockport	*	—	—
Mount Pleasant	*	—	—	Strathalbyn	676	6	3
Mount Remarkable ..	†	—	—	Sutherlands	*	—	—
Mundalla	†	14	11	Tantanoola	*	3	7
Mundoorra	*	—	—	Tarcowie	*	6	3
Murray Bridge	*	12	2	Tatiana	*	3	7
Mypolonga	*	7	4	Tintinnara	†	—	—
Myponga	*	—	—	Two Wells	†	—	—
Myria	*	—	—	Uraidla and Summert's	*	5	2
McNamara Bore	*	—	—	Waikerie	*	2	7
Nantawarra	*	—	—	Warcowie	*	—	—
Naracoorte	677	—	—	Warrow	*	—	—
Narriby	*	—	—	Watervale	*	—	—
Narrung	*	—	—	Wepowie	*	3	7
Netherton	*	—	—	Whyte-Yarcowie	*	—	—
North Boohorowie ..	*	—	—	Wilkawatt	*	—	—
North Bundaleer	*	—	—	Willowie	*	6	3
Northfield	*	6	3	Wilmington	663	—	—
Orroroo	*	—	—	Wirrabara	*	3	—
Parilla	*	8	5	Wirrega	*	—	—
Parilla Well	*	—	—	Wollowa	*	—	—
Parrakie	*	3	7	Woodleigh	*	—	—
Paskeville	*	—	—	Woodside	*	—	—
Penola	*	—	—	Wynarka	*	—	—
Penong	*	10	14	Yabmana	*	—	—
Petina	*	—	—	Yacka	*	—	—
Pine Forest	*	—	—	Yadnarte	*	—	—
Pinnaroo	*	—	—	Yallandee	*	—	—
Pompoora	671	7, 11, 21	4-13	Yantuee	*	—	—
Port Broughton	*	—	—	Yeehaana	*	—	—
Port Elliot	†	17	21	Yongala Vale	*	5	2
Port Germein	*	—	—	Yorketown	*	—	—

* No report received during the month of February.

† Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—April 11th, 1917.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

MORCHARD (Average annual rainfall, 11in. to 12in.)

December 9th.—Present: 16 members and three visitors.

TO MAKE FARM LIFE MORE ATTRACTIVE.—In a paper dealing with the problem of making farm life more attractive, Mr. G. W. Gregory said that, owing to the dullness and monotony of farm life, too many farmers' sons abandoned the farm and took up other work. That might be remedied by teaching the boys a better system of farming and stock raising, in order that they might specialise in any particular subject which appealed to them. There was much to be learned from the older countries of Europe, where there were training farms and colleges, conducted on sound, up-to-date, practical, and scientific lines, where the boys might after leaving school, take up any subject for which they had a liking, and not pay for being taught, but receive a salary for their services. By an arrangement of that kind the boy would, in a few years, become an expert in whatever branch he had adopted, and make a success in life. At the present time the cry was for specialists, and farming in all its branches required to be conducted on more scientific methods. Mr. J. W. Riechstein said that farm life was often unattractive because of the great struggle due to the failure of seasons, long hours of work, and the low price of produce through the middleman's profits. Mr. W. Toop said that the taxation of the farming community made farming less attractive. Mr. H. Brown advised that each farmer should set apart a few acres of crop or a certain number of stock for each of the boys, and that the returns should belong to them. Mr. I. G. Toop considered that every son should be given an interest in the farm and encouraged to be progressive and up to date in his methods. Mr. W. S. Twigden said it was unnecessary to send the boys to agricultural colleges if they could be sent to work for a practical farmer for a year or so. Mr. H. A. Tilbrook considered that an agricultural college training was essential for present day farming. Mr. F. Scriven held that agricultural training was exceedingly useful to a young man who intended to engage in mixed farming. Mr. R. Jasper advocated giving sons an interest in the farm, and when times were slack they should be allowed holidays and amusement. Mr. C. Longbotham declared that if farm life were made unattractive there must be bad management somewhere. Perhaps shorter hours, better wages, and better surroundings were required to make the life more congenial to young men.

GARDEN ON THE FARM.—Every farmer should have a fruit garden, affirmed Mr. E. A. Stott, in a paper on the garden on the farm, because, he said, it would make the home look more comfortable and the farm more valuable. Two acres in front of the house should be fenced off, wire netted, and planted with fruit trees, about 10ft. apart. It should be well watered, and a supply of seasonable fruit would be always available. In selecting a site for the homestead, consideration should be given to the location of a fruit garden, which could be well watered by floodwaters or sinking. If, when the homestead were built, a few pepper or gum trees were planted in double rows on the north and west sides, about two or three chains from the garden, there would be, by the time the fruit trees were bearing, good shelter from the gales which were so frequently experienced. Mr. W. Toop declared that every farm should produce sufficient fruit and vegetables for the household use. Mr. G. Gregory said that there was a spot on every farm which would grow fruit and vegetables. Mr. W. Twigden pointed out that vegetables were of great help in keeping down the cost of living on the farm. It was also a source of great

pleasure. Mr. C. Longbotham was of opinion that vegetables could be grown almost anywhere in the North, with proper care and attention. Mr. R. Jasper urged that every garden should have a breakwind of almond trees, planted back about 40ft. or 50ft., because the almond trees also yielded a return. Mr. J. W. Riechstein advised that only grafted trees should be planted and that both early and late varieties should be put in, in order that there might be always fruit in season. He was averse to the planting of gum trees as a breakwind. Mr. H. Brown emphasised that a garden on the homestead reduced the cost of living, and only required a small amount of work.

WILMINGTON (Average annual rainfall, 18.26in.).

February 7th.—Present: nine members.

HOME MIXING OF FERTILISERS v. MANUFACTURED.—In a paper read by a member, comparing the advantages of the home mixing of fertilisers against the purchase of manufactured fertilisers, the writer remarked that it was generally recognised that in order to obtain the highest yields the crop should have the benefit of supplies of certain constituents. It was true that when liberal supplies of farmyard manure were available, it would suffice; but the best system was to make the farmyard manure go as far as possible in moderate dressings, and to supplement it with fertilisers. That being admitted, the question arose of mixing the different fertilisers, and whether the farmer, as often recommended, should buy the different ingredients separately and mix them, or should buy ready-made mixtures. From a farmer's point of view, what were the advantages of home mixing? (1) In general, when considerable quantities were used, there was a saving in the purchase cost of the substances. (2) When separate materials were purchased, it was easier to control the quality. (3) In home mixing, the combination could be so adjusted as to adapt it to the special requirements of the soil and particular crop. The advantages of having the manures mixed by a manufacturer were:—(1) The interests of the manufacturer and the farmer were not opposed. What the manufacturer desired was to supply fertilisers which would produce good crops at a profit to the farmer, in order that the farmer might do well in his farming operations, gain confidence in the use of fertilisers, and so use large quantities. The manufacturers, requiring larger bulks of the fertilising substances, paying cash for them, and knowing the markets, were in a position to buy supplies at much cheaper rates than the farmer, and they could give, in the mixtures they sold, a part of that benefit to the farmer. (2) It was contended that the farmer could control the quality better if he purchased three substances, say, sulphate of ammonia, superphosphate, and potash. To accurately control the quality required three analyses, with three analytical fees, whereas the manufacturer had his own chemist, who could check the quality of the goods delivered to the factory. (3) Most manufacturers were now willing to compound manures according to a given formula or the special prescriptions of the farmer, making a fixed charge for the mixing operation, and giving a guarantee for the quality of the different substances used in the mixing. (4) There was, no doubt, some educational value in a farmer making his own mixtures, but that advantage might easily be overrated and more than weighed down by disadvantages. As a rule the farmer would do better to purchase from a reliable manufacturer. The mixing operation, if performed properly, was not so simple as many people imagined. The different substances required to be first reduced to a very fine powder, the quantities carefully calculated, and then mixed uniformly. To effect that evenness of mixing, they should be turned over several times, passed through fine sieves, and screened. A sample taken of a home-made mixture very rarely yielded the results it should theoretically according to the substances employed. In conclusion, it seemed that a farmer consulted his own interests best by entrusting a manufacturer in whom he had confidence to make his mixtures. At the same time, the farmers should not neglect to study the analysis of their soil, and see that the quality of the manure was appropriate to the requirements of their own soil and the crops they were about to grow.—Mr. T. D. Peck said that the farmer of the future would require to be a chemist, as well as a tiller of the soil. He thought the home mixing of fertilisers would prove to be educational. Messrs. I. G. Shippan and J. F. A. Zimmermann could see no advantages in home mixing, except on experimental plots. Mr. Moystach said that he had tried a mixture of drift sand and sheep manure with excellent results.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

ANGASTON (Average annual rainfall, 22.25in.).

February 2nd.—Present: 17 members and two visitors.

LIME, AND ITS ACTION ON LAND.—A paper on lime and its action on land was read by Mr. J. P. Richardson, as follows:—At one time in the European countries lime was the chief means of improving the land for agricultural purposes, but of late years the practice of liming has greatly decreased. Three reasons may be assigned for this. In the first place, experience has shown that a second application of lime is seldom followed with such good results as the first application. Secondly, during the past 40 or 50 years the use of artificial manures has greatly increased, and, compared with lime, these yield quicker and surer returns. Finally, liming land requires considerable labor, and this becomes scarcer and dearer annually. In spite of these facts, however, an application of lime to land is, under certain conditions, still profitable, although its effects may not be so quick or apparent as those from artificial manures. Although the cost of liming is comparatively high, it must be borne in mind that the effect lasts for several years. Lime is present in combination with many minerals more or less generally throughout the world, but for all that there are soils upon which it is probable that lime is needed as plant food. Generally, however, if lime is required at all in the soil, it is as a stimulant or amendment. Limestone should be burnt before being used for agricultural purposes. As limestone, it is a compound of calcium carbonate, and the burning drives out carbon dioxide, and leaves calcium oxide, or quicklime, as it is generally termed. The more evenly this can be distributed over the soil the better the results will be. Lime greatly improves compact and clay soils, especially if they are in such condition that they tend to bake badly. This improvement is not only due to discouraging denitrification, but also in consequence of the general effect of a more free circulation of air, the creation of conditions more favorable to nitrification, and, finally, also by virtue of increasing the penetrability of the soil by water, whereby surface erosion is greatly lessened. The storage of water in the soil is also increased, and its subsequent capillary movement is better regulated to supplying the needs of plants. Such soils, after being limed, are more easily worked. It is also true of light, sandy, and gravelly soils that the use of lime improves their condition by the mere adding of fine material, which therefore increases their lifting capacity for water. But heavy liming of light soils in hot climates, and especially if they are deficient in organic matter, should be avoided. A second, and perhaps more important, action of lime on the soil is its power of hastening the decay of vegetable and animal matter. This property must not be confused with the caustic or burning action of freshly burned lime, because, when spread on the soil, quicklime very rapidly loses its caustic properties, and becomes what is known as mild lime (especially if the soil is damp), and its presence in the soil in this form creates conditions very favorable to decay. The vegetable matter in the soil, roots, stems, and leaves of plants, &c., whether left there from previous crops or applied in the form of farmyard manure, contains valuable fertilising material, which is useless (except as a mulch) until decay has been effective. The most important property of lime lies in its power of hastening this process, and resolving vegetable matter into the compounds from which it was originally formed, and thus rendering it once again available for plant food. Lime in itself is not a manure. True it is that all plants take lime from the soil, but there are few soils which do not contain more lime than is removed by years of good crops. Everyone is familiar with the action of lime on pasture. The grass is greener and more readily eaten by stock, which do better on it. An application of nitrate of soda produces the same result; so also does a top dressing of stable manure. In each case the greenness of the pasture is due to the same cause, viz., the stimulating effect of a nitrate. In the case of the nitrate of soda and stable manure, the nitrate is added, but in the case of the lime the organic matter in the soil is more readily decomposed by the lime and the nitrates made available for plant use. Nitrogen, however, is only one of the substances whose presence in or

absence from the soil determines its fertility. Plants require a supply of phosphorous and potassium also. These two important substances exist in vegetable matter, and also in the mineral parts of soil itself. Like nitrogen, they may be present in considerable quantities without exerting any appreciable influence on the crop yield, due to the fact that they are in compounds which do not make them available for plant food. The natural action of air, water, frost, and other agents in the soil reduce them slowly to forms which stimulate plant growth, but if the land be treated with lime, the process of reduction is accelerated. It must be observed, however, that lime causes what might be termed an unnatural drain of the available stock of nitrates, phosphates, and potassium in the soil. That lime tends to exhaust the soil was well understood by our forefathers, who expressed the fact that its application enriched the father but impoverished the son, and if used without manure it makes both farm and farmer poor. From the foregoing it can be understood why a second application of lime generally fails to produce such a good result as when first applied. But lime has also the property of sinking rapidly into the soil, and this process may go on to such an extent that a fresh application is necessary not only to improve the land for cultivation and allow water to pass through more readily, but also to hasten the decay of the accumulation of vegetable matter and of portions of the subsoil which under a system of thorough tillage are steadily being brought to the surface. Lime has other properties, too, which should be noticed. It destroys acids in sour soils. Plants which grow on sour land or bog, such as sorrel and other coarse grasses, disappear after a treatment of lime, and are replaced by sweeter vegetation. Lime also destroys many insects and slugs. Generally speaking, the best results are obtained from the uses of lime if applied to heavy soils, probably those through which water passes with difficulty; also lighter soils well supplied with vegetable matter, and thereby drained or reclaimed sour lands. Chemical analysis of a soil is not a sure guide as to whether lime is needed. Certainly, to anyone who has a good knowledge of chemistry, it may afford some indication of the probable effects of lime, but landholders should find out by practical experience on a small plot by dressings of lime. If a beneficial result be shown, then the whole field should be done. As regards the time of year to apply lime, that depends on the crop to follow. For instance, if grasses or lucerne are being sown, the lime should be applied three or four months before sowing, but if applied to pasture, then apply in the early autumn, when there is not much risk of rain falling at once and forming the lime into a paste before it has been air-slaked. I take it, however, that the majority of this Bureau would consider the use of lime from a horticultural aspect, and in that case I think the application should be made in the autumn, as soon as the leaves have fallen, or, if not then, I would suggest just before the buds burst in early spring. In either case, harrow as soon as spread. To give the best results lime must be applied in as fine a powder as possible, and also as soon as possible after it has been slaked. The finer it is the more evenly it can be distributed and the more quickly it acts. When applied to stony soils to open them up use from one to two, even three, tons per acre. Generally speaking, the best plan is to cart the fresh lime direct to the land and lay it out in small heaps 6yds. to 8yds. apart and cover with soil and leave until air-slaked. When slaked spread evenly with a shovel. Heaps of 40lbs. 7yds. apart equals 2 tons per acre. The form of lime to buy depends on the price, but generally speaking that will depend on the freight and cartage. Where freight charges are high quicklime will generally be found the cheapest form to use as will be shown by the following:—If 178lbs. of carbonate of lime be freed of the carbon dioxide, it will be found to then weigh 100lbs. only (and this is known as quicklime), so that in every two loads of such carbonate of lime there is really about seven-eighths of a load of carbon dioxide gas, which materially increases the cost of handling. When quicklime is fully water-slaked 100lbs. of it take up 32lbs. of water, thus increasing the weight by one-third. Ordinary air-slaked lime, owing to the fact that in the slaking process it takes in some of the carbon dioxide and some of this again has reverted back to the carbonate of lime, is even more expensive to handle than the water-slaked lime. The longer it is exposed to the air the more it increases in weight until eventually it all reverts back to the carbonate of lime, and the 100lbs. of quicklime thus represents 178lbs. of carbonate. Care should be taken when handling fresh lime, as injury to the eyes might easily occur.

LONE PINE.

February 13th.—Present: 13 members and three visitors.

PRUNING VINES.—The structure of the wood of the grape vine, and more particularly of the annual shoots, known as canes, with which the pruner was chiefly concerned, remarked Mr. Ted Fromm, in a paper on pruning vines, differed from that of any other kind of fruiting plant. In those shoots was met, for the first time, a clearly defined division of the cane into nodes and internodes. The internode consisted of a large central pith, enclosed in an encircling layer of woody tissue, which, in turn, was enveloped in a thin, close covering of bark, composed of continuous and closely packed fibres. The node, on the other hand, held no central pith, its place being occupied by a wedge-shaped septum, composed of a mass of tissue, less fibrous than the external, which surrounded it. Upon the external woody tissue, where the upper edge of the wedge joined it, the bud was attached. Arising from the soil was the trunk or main stem, from which developed the main arm, or arms, and from those again were developed the secondary arms. From the secondary arm arose those annual shoots or canes which were most valuable, because they bore the buds which produced the crop in the ensuing summer. Hence they might be called the fruiting wood. Then there were the other annual growths, which did not take their rise from the ends of the secondary arms, but came direct out of the stem or main arm, or maybe they arose from older portions of the secondary arms. Those growths were commonly known as water shoots. That was owing to their great vigor of growth, and because they emerged from wood more than one season older than themselves. Those water shoots did not, as a rule, carry buds from which fruit could be expected in the following summer, consequently they were not relied upon as fruitbearers. They possessed, however, two points of value—firstly, if a gap existed in framework, an arm to fill it might be developed from the water shoot, or, in the case of secondary arms or spurs becoming exaggerated in length, a properly placed water shoot afforded an opportunity of renewing the said arm or spur. If the water shoot were not needed for either of those purposes, it should be completely cut off. Another type of shoot came from a bud upon the buried portion of the stem. This was called a sucker or an offset. That shoot had no value whatever, and should simply be cut away. In approaching a vine, whether spur or rod pruned, trained as a bush or on trellis, the pruner should observe the vigor of the plant in the growths of last season's canes. If they were numerous and very spindly and weak, it would be advisable to prune hard, allowing a lesser number of spurs or rods, or both, as the case might be, than he observed were left at the previous winter, and just so far as the weakness of the plant indicated, so those spurs should be individually shorter. A very weak rod-pruned vine might need reducing to a few spurs only, as that practice usually resulted in a lessened number of shoots, which were individually stronger. A pruner entering a strange vineyard, might not know for certain what varieties they were, and should therefore observe where the bunches of grapes had been carried, and how many of them. If the shoots arising from the spurs left at the previous pruning had borne fruit freely, then the variety needed spur pruning; but if there was little sign of such a result, rod and spur pruning should be resorted to. The amount of fruiting spurs and rods which should be left differed according to the sizes of the vines. For a vine of moderate strength, in rod and spur pruning, no more than two rods and two spurs should be left. The rods should not exceed more than from 10 to 14 buds, and on a very strong vine double that could be left. In spur pruning, 10 to 12 spurs would be quite sufficient for a vine of moderate size. The vine should not be pruned before all the leaves had fallen, nor when the buds had begun to shoot. A pruner should always cut a rod with one clean cut, which would produce a smooth surface. By making a rough, jagged cut the result would be that in a dry season all vines so pruned would suffer the most. The pruner should bear in mind that the golden rule of permanently successful pruning consisted in establishing and maintaining all the fruiting wood grown from any one vine upon a common level, so that the sap might be distributed evenly to all parts.—Mr. J. G. Hoffmann said that the water shoots should be cut away in summer pruning, when they were young. Members generally agreed with the views expressed in the paper.

WESTERN DISTRICT.

KOPPIO (Average annual rainfall, 22.40in.)

February 6th.—Present: six members.

WHEAT VARIETY TESTS.—The secretary presented the reports on the wheat variety tests conducted on Mr. G. B. Gardner's farm for the third year in succession. It was to be noted that the average had considerably increased each year. In the current year the average of the six plots was 26bush. 10lbs. per acre, which was 7bush. 15lbs. above last year's average. The plots were sown on land fallowed in August, cultivated in May, and drilled on June 8th with 1bush. of seed and least mineral super. per acre. The land was harrowed after the drill. The detailed results were as follows:—Plot No. 1, Federation, yielded 28bush. 44lbs.; plot No. 2 (early), Doris, 25bush. 50lbs.; plot No. 3 (early), Coopers, 26bush. 40lbs.; plot No. 4 (mid season), Dart's Improved, 28bush. 4lbs.; plot No. 5 (mid season), Yandilla King, 26bush. 48lbs.; plot No. 6 (late), West Australian Crossbred, 20bush. 54lbs. The average of the plots for the three years in succession was as follows:—Plot No. 1, Federation, 25bush. 33lbs.; plot No. 2, Doris, 16bush. 2/3lbs.; plot No. 3, Coopers, 15bush. 25lbs.; plot No. 4, Dart's Improved, 17bush. 13lbs.; plot No. 5, Yandilla King, 15bush. 35 1/3lbs.; plot No. 6, West Australian Cross, 11bush. 37 2/3lbs. The past season, although too wet in the beginning, was very favorable towards the crop, good spring rains falling; consequently an excellent sample of grain was produced. Federation was again well ahead of any other variety, thus proving a very suitable wheat for this district.

MUNNIPA, January 13th.—Mr. A. J. Gollce read a short paper on straw, which excited considerable discussion. Members agreed that straw was invaluable as a bedding for pigs, but not as food, except in the somewhat unusual case of pigs fed wholly on animal offal, when a little straw would doubtless be useful to balance the high proportion of proteids in the offal. Members also agreed that barley straw was best, both as food and bedding. Mr. L. J. Cook explained the disadvantages of straw as fodder, owing to its bulkiness and the large proportion of fibre it contained. Mr. E. J. Turley said it was beneficial to feed straw to milch cows in the morning prior to green lucerne. Horses preferred old thatch straw to clean oaten straw. Mr. G. V. Lindquist contended that where harvesters were used it was better not to save the cocky chaff, but to cut and preserve the straw instead, because the food value of straw was greater. Wheat, when fed to horses with straw or cocky chaff, should be given half in its raw state and half boiled, before being mixed with the chaff. There was no danger in feeding wheat to horses, provided they were turned loose in a grass paddock at night. Mr. A. Yates said that he had done six weeks' carting with an eight horse team, which was fed on 15lbs. to 20lbs. of wheat per head per day with cocky chaff.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

RENMARK (Average annual rainfall, 10.93in.)

DIPPING AND DRYING THE SULTANA.—A paper was read by Mr. H. Showell on dipping and drying the Sultana, as follows:—In this paper I treat only of Sultanas, as I have not much experience with other varieties of grapes; but the same principles will apply to all dipped grapes with suitable variations. For convenience, it will be divided into three parts—1st, the fruit; 2nd, the dip; 3rd, drying and after treatment. 1. *The Fruit.*—Little need be said of this; it is a determined factor by harvest time. Fruit that has been checked from want of water in the swelling and ripening stage will not dry well either as to looks, color, or weight. The same applies to fruit from salty land. It is desirable for fruit to be freshly picked, though by altering the dip no appreciable difference in result will be found in fruit up to several days old, or even a longer period. I do not find that brown fruit dries a bad color; the best of all is the whitish, very slightly amber, fruit that looks like crystallised honey. The most difficult fruit to dip is the heavily shaded green fruit, even though ripe. 2. *The Dip.*—All dipping is a

compromise to get best average from the different qualities of fruit in a tin. It does not seem practicable to make two pickings. This compromise is further complicated by the fact that in a tin all the fruit does not receive the same 'dip,' either as to time or temperature. Every tin will have over and under dipped fruit, and some will be just right; also, if left long in the tin the centre fruit gets over cooked. It is an advantage to follow with a cold dip, to cool the fruit. This should not be plain water, but soda, about the same strength as the dip; two to four buckets should always be cooling, and changed after each run. Greasy or whitish spots on the dipped grapes are due to insufficient action of the dip. When the grapes are pressed tightly together, where two grapes touch will be a spot more or less unaffected by the dip. This effect is more frequently met with when grapes are picked, carted, and dipped in the same tins, as they pack down very close. The effect is not very apparent on the finished article, especially if well sweated. There are many combinations of strength, temperature, and time, within limits, which all furnish much the same results. Thus, if the temperature is too low, longer and stronger will equalise matters, or longer above; but color will suffer if the temperature is raised to compensate for weakness or a too quick dip. There is an optimum of all three which will give best results on the individual fruit. For determining this I can lay down no definite rule. Personally, I empty the dip daily, as I put through 700 to 800 cases in that time. This is not absolutely necessary—within limits, the color of the dip will not affect fruit, unless it splits badly, when the cracks will show dark edges. If not too dirty, an old dip is no disadvantage; per contra, a new dip is equally efficient as an old one. Strength may vary within wide limits. My usual is from 12 to 13 to 1. The usual way of stating strength is in gallons of water to 1 lb. soda, thus 20 to 1 would be 1 lb. soda to 20 galls. of water—really $\frac{1}{2}$ per cent. No rule can be made for strength; it must be varied to suit the varying qualities of fruit, especially if they turn in the early part of the season. I endeavor to crack the fruit as little as possible. Early green fruit will crack badly; late and ripe fruit not at all visibly. Visible cracks are not necessary; on green fruit, early in the harvest, they cannot be avoided; later on there should be no trouble with over-cracked fruit. The time of the immersion varies with the man. I adopt a steady stroke, and do not vary it, but vary the dip to suit the stroke. After 3 p.m. a man unconsciously dips slower, and I weaken the dip in soda and temperature to balance this. The nose of the basket should be dipped first, and the dip thrown back over the grapes. Never dip straight down and up—the bottom will be much over-dipped if the top gets enough, unless a very slow stroke is used. The temperature of the dip is the crucial point in getting even color. Most dips go off in the afternoon; this is not due to dirty dip, as supposed, but to the fact that the fruit, being hot itself, gets over dipped. The temperature must be varied to suit—first, the weather, and next, the time of day. I usually start about 204deg. or 206deg. on the previous day's fruit, drop to 202deg. on new fruit, drop to 200deg. at 10 o'clock, and 198deg. after dinner; then, at 3 p.m. drop again to 196deg. or 194deg., according to the day—on a very hot day even lower. The thermometer outside the dip is as important as that within, if one desires color. I keep the dip within 1deg. of the temperature I determine on, and to secure this use steam heating. It could not be done so evenly on a fire dip, though many men are very skilful in keeping an even temperature. It is very fortunate that a simmering dip is automatically about 204deg., and about right for the morning, though too hot for the afternoon, except on cold days. This is why so many get dark fruit in the afternoon. Using the above methods I last year turned out, for the first time, the whole of the fruit treated on my home ground as 3 and 4 crown, with no picking over whatever. Every pound of fruit put in—about 14 tons—was redipped for dust, some of it twice, in a cold soda dip. This shows the quality, as even after that depreciation it was still 3 crown. Of course the season was favorable. Such a result could not be obtained in bad weather, but even with the best of weather it is notorious that many men cannot turn out even a day's work of even quality. As is well known I use the ordinary methods of chemical analysis to determine and keep the strength of dip even. I need not elaborate on that now. If the temperature is carefully regulated the strength of dip, whilst a big factor, is, within wide limits, of less importance. I prefer not to put the fruit through too quickly. It is evident there will be less difference between one part of a basket of fruit and another if the time of immersion is increased by reducing the temperature and strength than if a

very rapid dip were practised using the limit in strength and heat. Try the experiment of dipping a long thin bunch down and up as rapidly as possible in a very strong, say 2 to 1 dip at about 204 deg. You will find the tip dries nearly black, the middle dark, the top just right, and the extreme top insufficiently dipped. A difficulty sometimes met is a white deposit on the rasins, especially on the Gordos. This is due, not to too strong a dip, as commonly supposed, but to insufficient strength, a cold soda dip following the hot one will as a rule do away with the trouble.

3. *Drying and After Treatment.*—I have entirely given up trays on my home drying ground, excepting in emergency, and dry all on racks, and the system I am converting everything to is a galvanized-iron-roofed double rack of eight tiers each, which latter are moveable. This can be seen on my place, so I will not go into details. In spreading, I have tried many devices, but have found nothing better than hand work. The fruit should not entirely cover the wire, so as to block the air ascending through the tiers. I get $5\frac{1}{2}$ tons to 6 tons of dry fruit off a double rack 100yds. long, eight tiers deep, equal to 1,600yds. of netting 4ft. wide. The actual dried weight taken off a given rack will vary according to the ripeness of the fruit. This rack gives every satisfaction, and a better color than trays. The bottom tier is, of course, covered with hessian. When sufficiently dry the fruit is knocked down on this and if possible left for a day or two to sweat (unless the weather is bad). It is then placed in half sweat boxes and cross stacked in a shed for 10 days or more to sweat up before it is boxed. By this, one avoids sending in damp fruit, and it steams better; also the fruit can be got in much damper as drying will proceed and finish in the shed. If the weather is threatening, I do not hesitate to run fruit in, in this way, even if only seven-eighths dry. It is easy to carry boxes out and turn over for a day or two to finish if it does not do so itself in the shed. These storage sheds repay the cost in a single season. The fruit can be saved from risk of rain and can be inspected and blended if necessary without trouble or risk when boxing up. I regard this as a very vital part of the operation. It needs a good supply of sweat boxes. I have over 1,000 in use on the one drying ground. This will equal about 10 boxes for each ton of fruit harvested and is none to many. I regard the sweat box as part of the drying plant, and not for storage and delivery only. There is the added advantage that fruit can be accumulated until there is time to cart it away. It can be rushed in while the weather is fine and boxed up when there is a lull owing to weather, or being full up. I do not hand grade any fruit; if it wants hand picking the odds are it will not be improved a grade by the process, and you have lost your labor, and created a quantity of still lower grade fruit in so doing. In conclusion, I can lay down no royal road to secure a good grade: the fruit, the weather, and the dipper must all be studied and the principles I have tried to explain applied as necessary. The time the drying takes is of minor importance, provided there is not too much damp weather. If drying goes on continuously, equal results can be obtained whether the time be five days or 15 days. The worst weather of all is hot, muggy, humid weather, especially early in the season, when the sugar content is low and the grapes watery. The grapes will take little hurt in cold, windy weather. I have not found that there is any difference in quality between cinctured and uncinctured grapes, so far as drying goes, either in color or weight. If anything the cinctured fruit may tend to be more elongated and slightly whiter than the uncinctured. The cinctured fruit stands better on the vines than that not treated, so far as hanging late in the season goes—possibly because it is slightly later in ripening. A point that needs attention is the question of after treatment in the packing shed, to sterilize the fruit and prevent its going grubby. I have made some experiments in this direction, but so far without much result. The sulphuring of Sultanas I have definitely turned down; the technical difficulties are great and even if successful the result does not appear to be satisfactory. Basket dipping is not altogether the best method, especially when the fruit is picked and carted in the same tins, as the berries tend to pack together, preventing the dip penetrating. The old tray dip gave better results, but is not very workable in practice. A very great improvement would be an automatic dip to run the fruit through thinly on a belt. At least a day's time in drying, or even more, could be saved by each bunch being dipped exactly the right amount, as cannot be done in a deep basket. I intend to experiment in this direction and believe that if this could be worked out satisfactorily, one could rely on turning out four crown consistently, given good weather and good fruit. In conclusion apply the following

rules:—The strength of the dip is regulated to suit the quality of fruit, that is to attain the desired disintegration of the skin and change color from purple to brown. Temperature is regulated to get the depth of color desired from brown to golden. Time in the dip should be an easy stroke for the dipper and other conditions varied to suit him. The dip had better err on the strong side if anything. The temperature, if a light color is desired, should err on the cool side, but not so much as to make fruit slow in drying. Both under and over dipping will cause fruit to dry slowly; the first because the skin is not sufficiently affected; the second because sugar leaks out and seals the cracks up. While considerable variation in strength of dip is admissible, rule of thumb methods are too erratic to get consistent results. I have had samples brought to me so weak that they were drinkable. Let each grower conduct experiment for himself in however small a way and so that in time we can rely on turning out a guaranteed sample. It is bad enough to get low grade through bad weather, without getting it when everything is favorable. The settlements in any ordinary season ought to turn out at least 80 per cent. of 3 and 4 crown fruit. Until the time arrives—if it ever does—that dipping and drying are on exact, set lines, every grower must depend, to a large extent, on his own expertness in adjusting methods to the varying conditions of weather and fruit. If anything in this paper is not clear, I shall be pleased to see any of you at my drying ground when actually working next month, and give any information I can. There are no trade secrets in fruit drying so far as I am concerned. The better the settlement can do, the better for each one of us individually. Supplementary to his paper, Mr. Showell stated that the average strength of dip used for the Sultana would be about 14 to 1. The whole secret of getting good-colored fruit depended on observing the temperature of the grape and the temperature of the dip.—Mr. Bacey said that Renmark Sultana growers owed a great deal to Mr. Showell, who had been the first to work out and apply the Burette system of testing, and had also first struck the idea of varying temperature. He agreed that a high temperature was a mistake, but questioned the superiority of newly picked fruit. In his experience best results were obtained from fruit that had been picked a couple of days; and one year, when heavy rain delayed drying operations, he had made very good Sultanas out of fruit that had been in the tins for a week, using a 10 to 1 dip. (Mr. Showell thought that early dipping was best for greenish fruit.) Mr. Showell's advice to have plenty of sweat boxes was right, but it was a counsel of perfection. Mr. Showell said that what was spent on sweats was saved in trays. Mr. Howie remarked that Sultanas had set very heavily this year, bunches weighing 5lbs. or 6lbs. being frequent. He asked whether Mr. Showell still adopted the practice of splitting the bunches. Mr. Showell said that he always split them. Formerly the bunches were cut on the trays, but now that the racks were in use, they had to be cut when they were picked. It meant more loose berries, but was safer than drying them uncut. Mr. Waters understood that all the Sultanas on the English market were sulphured, and wondered whether it would pay Renmark growers to sulphur for export purposes. Mr. Howie said that the high-grade Sultanas in England were certainly sulphured, but it was a difficult thing to find out at what point in the drying operations the sulphur was used. Mr. Showell questioned the alleged sulphuring of the bulk of the English fruit. It was not practicable to sulphur Sultanas on racks, and he certainly did not intend to kill himself by trying to dry 100 tons on trays. Mr. Cole had sent some sulphured Sultanas to London, and had received a very discouraging report about them; also similar fruit was sold in the State as 4-crown. When he was in the trade in London, 25 years ago, there were no sulphured Sultanas on the market. Mr. Agars had known Sultanas sulphured for three or four hours after dipping in Mildura. Answering a question about the second (cold) dip, Mr. Showell said that it served to cool the fruit, thus preventing the centre of the bunch from getting over-dipped; it helped the darker berries, and removed the whitish appearance sometimes found on the berries. Mr. Bacey had tried the cold dip, but had turned it down. Certainly he was working on a smaller scale than Mr. Showell, and the fruit was never long in the tins. He had not found any advantage in the practice. Replying to a question regarding the relative qualities of fruit dried on trays and racks, Mr. Showell said that the rack-dried fruit averaged half a crown better quality than that dried on trays. His manager, Mr. Alexander, had tested half a ton last year, and the fruit on the trays dried out at least half-crown lower than that on the racks. Mr. Bacey got the better quality on trays. Mr. Showell had poor results from the racks at first. The right methods came with

experience. On the question of the frequent changing of the dip, Mr. Basey mentioned that the late Mr. Alf. Johns, who always dried a good sample of fruit, used to go through the whole season with the same dip; he used it fairly strong and fairly hot—about 198deg. A high temperature was undoubtedly a mistake. The maintenance of a right temperature depended largely on having water handy to the dip. His practice was to keep a kerosine tin of water, with a nail hole in the bottom of the tin, on the edge of the dip, which thus received a continuous jet of water. Care had to be used in firing with green as well as dry wood. With regard to his advice to dip the basket nose first, Mr. Showell said he was aware that Mr. Muspratt dipped straight up and down, but he used a very slow dip. Nose first was the safer plan. Answering a question as to the addition of soda to the dip, Mr. Showell said that last year he had added 3lb. after every 40 tins; he used from 5lbs. to 7lbs. to a ton of fruit, instead of 15lbs., as formerly. If the fruit were dipped before it had a chance to split and sugar, a great saving in soda was effected. He would give them a tip. If they had Sultanas under dipped, and looking dull and rusty, it was a good plan to crush some ripe grapes and sprinkle the juice over the fruit spread, after sweating, on hessian. Questioned concerning the green color that sometimes occurred in fruit boxed straight off the rack, Mr. Showell said that he always had his fruit on hessian before boxing. Fruit evened up after it had been a month in the sweat, and that was one of the advantages of a good storage shed. Last year he had 30 tons of Sultanas in the shed before carting any in to the grader. For taking fruit off the rack he had found time. Pegs were far better than nails for fastening hessian for side covers, and pinning up the hessian edges when taking off the fruit. They were extremely cheap if bought by the box. Racks cost more than trays in the first instance, but there was a big saving in depreciation. A rack to dry six tons at a time was equal to from 5,000 to 6,000 trays, reckoning that the rack could be used only three times in the season and the trays five times. In normal times, and in a very rough reckoning, such a rack would cost £200, as against a cost of £150 in trays. On present prices the cost would be nearly 50 per cent. more. He was unable to formulate a rough-and-ready test to tell when fruit was dipped right. It was a matter of instinct. Mr. Basey said that his method was to take one of the white opaque berries, and if he could just find a crack in the skin he knew the dip was right. Mr. Showell said that if there were hot winds, and the fruit was wilted, none of it would crack. The early fruit was very difficult to deal with—the margin either way was very small; it was easy to dip when the fruit was ripe. Allowance had to be made for fruit from different blocks, and sometimes even for fruit from different parts of the same block. He varied the dip for every block, and sometimes from one end of a block to another, until the fruit was dead ripe at the end of the season; then it was all pretty well the same. Ripening was delayed by too much water, and also by too little. For a small grower, dipping half of each day, the better plan would probably be to pick in the afternoon and dip next morning. The dip should affect the skin only, and never the fruit, and after the grapes had been dipped the skins should still be acid, and not alkaline. If there were alkaline, the fruit was being overdipped. It did not hurt fruit to be stale before dipping; he had dipped fruit two weeks after picking, and had got good results, using a stronger dip than usual.

[This paper was read at a meeting of the Branch held early in 1916.—Ed.]

POMPOOTA.

January 29th.—Present: 35 members.

DAIRYING.—In an address on dairying, Mr. G. Laue said that he based his remarks on a practical experience of 20 years. Returns from dairy cows were usually calculated on a nine months' basis, but he considered the basis should be 10½ months milking and 1½ months dry. A cow should, at least, average 24galls. per day for 10½ months. He knew of an instance at Murray Bridge where, during the winter months, 43 cows averaged 3galls. and 2lbs. of milk per day. In managing dairy cows kindness and cleanliness were essential, and the animals should be made pets as far as possible. In winter cows needed one-third more feed than in summer. They should also have plenty of good clean water to drink. He advised adhering to lucerne, barley, and maize for feeding. He had taken 60 tons of maize per acre off swamp land, and a yield of 24 tons per acre was quite pos-

sible on irrigated land. It was not profitable to graze cows, and he gave an instance in which 45 cows in nine months gave better returns than 120 which were grazed. He did not recommend rugging cows, owing to the changeable nature of the climate. It was better to erect a shed, where they could obtain shelter when they required it. He favored rearing calves, but the cow should be the first consideration. A calf should be given 2galls. of skim milk per day.

BOOKPURNONG EAST, February 17th.—A long and interesting discussion took place on the use of the traction engine on the farm instead of horses.

MONARTO SOUTH, February 10th.—The sampling of wheat, usual at the first meeting after harvest, took place. There were 12 samples, ranging from 61½lbs. to 65½lbs. per bushel. The average was fixed at 63½lbs. to the bushel.

SOUTH AND HILLS DISTRICT.

CYGNET RIVER.

February 1st.—Present: seven members and one visitor.

DAIRY COWS ON THE FARM.—To make a success of dairying, remarked Mr. W. J. Weatherspoon, in a paper on dairy cows on the farm, the cows must be given the proper class of feed. It was not sufficient to turn cows into good grazing paddocks, because they required bran and chaff, and, the last thing at night, should be given long hay, cut on the green side. They also required plenty of good clean water at all times. Each cow should be tied up when being fed, in order that each might receive its proper quantity. Sorghum and maize could be grown along the Cygnet River, and lucerne could also be profitably produced without irrigation. A few acres of barley or rye should be sown for early green feed. He preferred the Shorthorn-Jersey crossbreed, because they were good milkers and were a handy sight for the butchers when they had finished. Bulls for stud purposes should be pure bred, with a heavy milking strain on both sides of the pedigree. Cows required protection against winter storms, and half an acre of scrub should be provided on the farm for shelter. Mr. Loader contended that it would pay to rug cows, because heat required to maintain the warmth of the body would be utilised for producing milk. The extra milk would pay for the rugs in a few weeks. In answer to a question, Mr. Weatherspoon said he would dry off a cow from six weeks to three months before calving. Unless cows were milked regularly and quite dry, they would very soon go off their milk. If well fed and well milked they could easily be kept in milk for nine or ten months.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

February 8th.—Present: 13 members.

FRUIT CULTURE.—Taking it that the rainfall in that district was sufficient, or almost always sufficient, remarked Mr. J. W. Crompton, in a paper on fruit culture, it was not necessary to choose a specially fertile soil, for the greater the rainfall the poorer the soil might be. It was best to choose a soil that was easy to work, and a subsoil that would hold moisture well, and yet was porous, such as a red or yellow clay, or, better still, a clay with broken, decomposing stone all through it. It was also an advantage to have a small soakage of water passing deep below the surface; but those often suffered more severely in a droughty year than a deep clay. Protection from wind was very important, and an eastern aspect was the best in that district, as almost everywhere else. The east and south-east winds could do harm, but they were not so destructive as the winds from other quarters, and not so prevalent. The use of explosives in the soil depended upon the nature of the subsoil, and whether it was a standing orchard or land being prepared. In preparation it often paid. The soil should be very dry or very wet—preferably very dry. The depth depended upon the object of the explosion and the nature of the subsoil. It was often advisable to blast in summer the spot where each tree was to be planted the following winter, tamping the charge tightly with bonedust. The tamping should not be blown into the air, but the effect of the charge should be apparent on the surface. An old auger, with

the wings cut off, and assisted by a little water, was the best tool for making the holes. It soon became blunt, but if heated and tapped with a small hammer its keenness was easily restored. After blasting holes for planting, each hole should be bored out as if for a post, in order to ascertain that there were no big air spaces left. Those might be settled with a crowbar, and the hole filled in again with loose soil, and the bonedust tamping which had not been scattered by the explosion. When about to plant an orchard, blasting should be preceded by a deep ploughing and removing stumps and roots. The lines should be set up, and each position for a tree pegged. If all the measuring were done exactly horizontally, the rows would be straight; but if the measuring were done on the surface of the ground, and the ground was an uneven slope, the rows would be crooked, but the ploughing would come fairly even. That applied most where the orchard was to be so laid out that it could be ploughed three ways. The base pegs should not be marking tree holes, and should be firmly set, because if blasting were to be done, every other peg would be moved, and would require to be replaced later. After ploughing, pegging, and blasting, a heavily manured crop of peas should be planted, and the ground pegged again before the winter. Before the peas had developed much growth a square could be dug around each peg, and the tree planted 3ft. from the standing peas, which could be ploughed in during the spring. Where there was plenty of stable manure available, it might be spread over the whole surface, and the peas planted in it, but in most cases there was only sufficient to dig in close to each young tree. If blasting were not necessary, the holes should be dug out and manured deeply; but if the soil were blasted, a pint to a quart of bonedust should be forced well down among the cracks and the top soil manured. If there were no stable manure procurable, the peas would make a good substitute, as well as a good companion to it. In planting, great care should be taken that the roots were not doubled up, and there should be no badly torn ends, if they were not still in their own soil. The roots should not be pulled about more than was absolutely necessary. The tree should be lowered into the hole with the best roots directed towards the prevailing wind. The soil should be shaken in by hand, and pressed down occasionally. When the hole had been filled, and the tree buried a few inches above the crown of the roots the soil should be stamped on, or, better still, watered. The top should be cut back to the height at which it was to divide. Nothing should be cut very closely except sucker shoots, and nothing should be left standing sideways more than 4in. at the very most. It was easier to prune before planting. For a young tree to grow six even shoots was plenty for the first season's growth. A small tree like that did not cover much ground, and there was always a temptation to grow something between them; but barley as a green feed crop was inadvisable while the trees were small, because it encouraged blights and absorbed the manure of the trees unless it was dug round two or three times. Barleem was better, because it was not so tall, and was leguminous. If treated wisely, it did good to the tree when the last of it was ploughed in. To go on growing peas for green manuring certainly paid. If it were possible to turn out three tons to the acre of potatoes, it would pay to manure a pea crop for the winter, to plough it in, and plant potatoes. That was if average prices prevailed. If it would pay to grow potatoes between the trees, they could be planted each year until the trees were too big to be cultivated only one way. Onions could be put in for a change on less manure, or even none, after potatoes. When the trees were bigger, and beginning to bear, barley might be planted, and it would not do much harm, but would be in the way a little, perhaps. If barley were sown, the land should be ploughed as soon as the barley was off, and it should never be left late. Room should be made for summer cultivation, and little else was needed, except spraying, because the trees had been given a good start.

MOUNT BARKER (Average annual rainfall, 30.93in.).

February 7th.—Present: 46 members and two visitors.

RAISING NEW VARIETIES OF POTATOES.—About eight years ago, premised Mr. F. A. Joyner, in a paper entitled "Notes and experiments in raising new varieties of potatoes," he laid plans for attempting the production of new commercially valuable varieties of that universally used vegetable, the potato. Little did he anticipate the problems to be encountered. The experiment had been begun, and was still being carried on at Bridgewater, not an ideal spot for the purpose owing to the fact that the district was much subject to the visitation of frosts.

Unfortunately, Nature had placed a barrier in the road of production of new kinds from many of the best potatoes. He referred, of course, to production from actual seed, and not from so-called seed tubers. Many varieties were sterile, in that their flowers did not produce fertile pollen, and in some cases they did not produce any pollen at all. Again, some varieties appeared to possess infertile female organs, that was to say, the pistil of such a variety was defective in some particular. Either the stigma was not receptive to pollen, or the style did not permit of the passage of its tube growths, or possibly the ovary was deficient. The absence of fertile pollen was common to practically all varieties bearing light heliotrope flowers, although he had found fertile pollen in the flowers of one such variety, namely, "Mayfield Blossom." Some growers had claimed that they had produced new varieties by crossing "Up-to-date," which had light heliotrope flowers, but his experience with that variety had been unhappy. After a very great number of attempts he was able, on one occasion only, to successfully impregnate the stigma of an "Up-to-date" flower, and, as ill-luck would have it, the seed berry which followed was, whilst quite immature, broken off the plant by a falling apple tree prop. Many difficulties resulted in the loss of a season or two before successful cross-fertilisation was systematically established, and it was not until 1911 that the crossings were at all extensive. It was perhaps unnecessary to say much about the potato plant itself. They were all, he expected, quite as, if not more familiar with it than he was. The general appearance of the flower was, however, probably well known to all of them, seeing that potatoes were so largely grown in the district. It bore, as a rule, five stamens, arranged around a central organ—the pistil—the head of which, the stigma, protruded above the stamens. Each stamen bore, at its head, an anther, which was the pollen-bearing vessel, from the extremities of which the pollen, if present, was shed and fell on the stigma. The pollen there, in a sense, took root and sent down the style of the pistil thread-like tubes which, entering the ovary at the base of the pistil, discharged the male fertilising elements, which pierced the ovules and combined with the female nuclei. This was the act of fertilisation. The flowers were borne in umbels on stems about an inch long. Those stems, about midway in their length, had a ring or joint of sappy, cork-like substance which rendered the flower a ticklish subject to handle, for it broke off very readily at this ring or joint. It was rather an extraordinary fact that those flowers whose anthers bore no pollen broke off much more readily than those which bore pollen. In order to cross-fertilise a chosen plant, it was prudent to remove the anthers from its flower before the pollen was ripe. That precaution was really not necessary in the case of flowers whose anthers contained no pollen, but it was wiser in every case to remove the anthers, as it was sometimes difficult to determine whether pollen were present or not. The removal of the anthers was usually effected with fine emasculating scissors. He had, however, a method of his own. Taking hold of the flower just before it opened, he parted the petals, and with a finely pointed little stick, about the size of a wooden match, bent each stamen away from the pistil. If the flower were treated before it opened, the stamen would be found quite brittle, and it would readily break off at its base. The anthers, they would remember, were attached to and formed part of the stamens. The flowers so treated were left for a day or two until the stigma was ready to receive the pollen collected from the other variety which had been chosen as the male parent. When the stigma was so ready could be determined, because it became slightly sticky, and exuded a viscid liquid in sufficient quantity to make it appear moist. Theoretically one such application of pollen should suffice, but his practice was to make several applications, at intervals, in order to ensure success. Even then the proportion of misses was very high. In cross-fertilisation of plants it was usually necessary to protect the emasculated flowers from the visitation of bees and other insects which might bring to the unprotected stigma pollen from undesired sources. Such a precaution was apparently unnecessary in the case of the potato. Bees did not visit the flowers of the potato, and a flower from which the anthers had been removed before they had shed their pollen would seldom, if ever, produce a seed berry, unless fertilised by hand. The gathering of pollen, particularly from those varieties which produced but little of it, required patient effort. Frequently he had examined hundreds of flowers, and only succeeded in getting a mere trace of pollen. He found, too, that pollen from such flowers was very largely infertile. The plan usually adopted was to attack the anthers with a needle,

and collect the pollen on a slip of grass. He found this plan very wasteful of pollen, which was blown away in a fine cloud with the least breath of moving air. He used wooden pill boxes, coated inside with dead black, the pollen grains being more easily seen on the blackened surface. He had a series of those boxes. Each box had its own camel-hair brush, and was devoted to one particular variety, and never used for another without being first sterilised. The brush was used for dusting the pollen on the stigma. If the flowers of some varieties of potatoes were carefully examined the stamens with their anthers would be found imperfect. They were either bent or contorted, and would generally be found to be infertile. Once successful fertilisation had taken place, the ovary at the base of the pistil would begin to swell, and the stem carrying it would thicken and curve downwards. He had never seen that early sign of fertilisation. The seed berry expanded very rapidly and gradually turned yellow as it ripened. The number of seeds in a berry varied, and might amount to two or three hundred. When the berry was quite ripe it was picked, the seed extracted and carefully dried and put into a package labelled with its parentage. The seed was sown in boxes in springtime, and the young plants were transplanted into the open ground when an inch or two high. They should be given plenty of room, for they grew rapidly, and in their first season, in this climate, attained the ordinary dimensions of a plant grown from a tuber. The seed from a single berry was capable of producing extremely varied results, comprising tubers of all shapes and colors. From a berry obtained from the crossing of a white round seedling with Pink Eye, he obtained 42 varieties, consisting of 11 white rounds, two rose rounds, one violet round, one purple round, 12 white pebble-shaped, one purple pebble, four white round with pink eye, three rose-round with pink eye, one fawn round with pink eye, three purple pebble with dark eye, one fawn pebble with pink eye, and one white pebble with pink eye. Many of the seedlings so produced gave remarkable results quite early in their career. Indeed, the first crop from some of them gave quite a fair number of marketable potatoes. Now with regard to the actual experimental work; the 1911 crossings were typical of the work done. His object was the production of new varieties of marketable value, whose qualities should comprise productiveness, a good appearance, a good habit, freedom from disease, and good table quality. By good habit he meant not only a good habit of growth of the haulm, but good habit in the production of tubers close to the stem of the plant. With many market growers productiveness covered a multitude of sins, but he was ambitious to produce potatoes of all-round good quality. In 1911 he made 30 separate successful crosses, using many varieties well and favorably known, such as Brown River, Pink Eye, Snowflake, Bismarck, Fluke-kidney, Queen of the Veldt, and others. In combination with those he used other varieties not so well known. In 1909 Irish blight appeared. He was fortunate enough to have two varieties of potatoes which appeared to be strongly resistant to the disease. Concerning one of them, a good deal of discussion arose abroad. In 1901 a potato grower in Vienna, named Lubergerie, stated that a plant of the wild potato *Solanum Commersonii*, of white type, had given rise to a new variety by sporting or bud variation. He named the alleged new-comer *Solanum Commersonii* Violet, and it was under that name that he had imported it. A good deal of controversy arose concerning that potato, and after careful and systematic trial it was proved to be identical with a well-known Continental variety called Paulsen's Blue Giant. That potato had proved, in his experiments, a marvel in that it had never shown the slightest sign of Irish blight in its tubers, and only in one specimen had he ever seen blight in its haulm, and that was a very slight attack. He had grown that potato throughout his grounds in rows alternately with varieties which had been blackened out of existence by the blight, yet the rows of Blue Giant stood unharmed. Another variety he had used was an unnamed seedling which came from Ireland, and which, although not immune to the disease, had proved very resistant to it, and in addition was a very prolific pollen producer, and a potato of excellent quality. In selecting parents for a cross consideration had to be paid to the qualities which it was desired to reproduce. For example, a cross of the Blue Giant and the Pink Eye had inherited the disease-resisting qualities of Blue Giant and the productiveness of Pink Eye. Its color was intermediate, and it had unfortunately reproduced to

some extent the deep eyes of the Pink Eye. That seedling was very similar to an old variety, Plunkett's Seedling. From the crosses made in 1910 and 1911, he raised some thousands of seedlings, which year by year had been selected out, until they were now represented by 89 varieties, and that number would no doubt be again reduced during the coming season. The influence of the blight-resisting qualities of Blue Giant upon many of the varieties now in hand had been most marked. Many of the seedlings had never shown the slightest sign of blight, and whilst he would not dare to say that they were immune, he could at least claim for them very great resistance. That resistance to such a disease as Irish blight could not be determined in every season, because the disease required certain climatic conditions for its development. In those seasons when it had been prevalent, it had not been uncommon to find in a row of seedlings a variety quite unaffected, whilst varieties on either side of it had been badly affected. Resistance to disease was a transmissible quality. Bismarck had proved very susceptible to blight, and a very large proportion of seedlings raised from that variety proved equally susceptible. Resistance appeared to be a very variable quality. A seedling which, in its early years was resistant, appeared to lose its power of resistance as it grows older.

BLACKHEATH, February 3rd.—A paper dealing with rabbit destruction was read by Mr. F. Pym. In the discussion which ensued the opinion was general that the best method of exterminating rabbits was by trapping. The meeting was also favorable to the appointment locally of rabbit inspectors, instead of officers appointed by the Government.

CHERRY GARDENS, February 6th.—A newspaper extract on the conservation of water for stock was read and discussed. The value of constructing dams long, narrow, and deep, instead of broad and shallow, was pointed out, the heavy loss by evaporation being thus minimised. Mr Henry Jacobs pointed out that when a dam or waterhole became nearly empty the water became impure and dirty, and the stock lost condition.

LONGWOOD, February 3rd.—The meeting was held at the homestead of Mr. R. A. Lewis, and an inspection was made of the orchard, which was in splendid condition, having been sprayed with a combination of Bordeaux mixture and arsenate of lead. The plums were very fine, including the Satsuma, a variety almost new in the district, an excellent producer, which sold readily. Shipper and October Purple were also showing well. A row of 12 Kiefer hybrid pears attracted attention. Two of them were growing quite straight and ridged and the foliage was deep green, but they were not bearing very well. The other 10 were growing like willows, but were bearing heavily. Mr. Lewis explained that two years ago he had pruned the two, and last year they were clean and their fruit free from disease, but the 10 carried diseased fruit. Now, however, they were all clean, but there was a marked difference in the color of the leaf and the growth. Members considered that the quality and weight of fruit would be with the trees which were pruned. Mr. Beaumont's paper, "Orchard and Orchard Work," which was published in the February number of the *Agricultural Journal*, was read and discussed. It was mentioned that of two orchardists whose properties adjoined, one laid out his ground thoroughly, on the lines recommended in Mr. Beaumont's paper, but the other just prepared the land only fairly. The latter now had to go out to work to maintain his home, whilst the former netted a good income and was extending his area. There was a consensus of opinion in favor of drains, many declaring their preference for stone, if available. Mr. Roebuck said that he had tried various methods of drainage, but in sandy soil he strongly favored long timber on each side of the cutting, with stone across. Mr. J. R. Coles said that he had deep drains cut well into the clay, with large stones laid in an orderly manner along the sides of the trench, leaving a hollow on the bottom, then stones decreasing in size, brush on top of the stones, and then soil.

STRATHALBYN, February 6th.—Mr. R. H. Haines read a paper on pigsties, and Mr. J. Saunders one on pig raising. At the conclusion there was some discussion and a number of questions were asked.

SOUTH-EAST DISTRICT.

KONGORONG.

February 6th.—Present: eight members and three visitors.

GROWING GREENFEED.—In a paper on greenfeed growing in Kongorong, Mr. C. G. Wilkey advocated sowing rape and oats as soon as the early rains came. He had tried it for two or three years, and found it profitable. He turned in sheep to eat it off. He preferred oats to barley, because it stood feeding off better. Rape was one of the best fattening crops for sheep. Mr. S. Dixon agreed with the suggestion, which was declared one of the best things for Kongorong. Mr. W. A. Aslin had sown oats last year, and fed 125 sheep on a few acres. Rape sheltered the oats; stock ate the rape first and then the oats. The rape came again. Mr. C. Kemp had successfully tried sowing oats on the stubble. In Mr. C. S. McLean's experience oats stood more feeding than barley. Last year he had sown rape, and this year wheat, with the result that he could not strip the wheat for the rape. He was averse to sowing rape where a wheat crop was to be taken the same year. In reply to questions, Mr. Wilkey recommended Broad Essex as the best variety of rape. About 3lbs. of seed should be sown and left, of super. to the acre.

NARACOOORTE (Average annual rainfall, 22.60in.).

February 10th.—Present: 27 members.

BEST SHEEP FOR THE SOUTH-EAST.—After dealing with the history of the introduction of sheep into Australia, and the development of the industry, Mr. W. E. Rogers, in a paper on the best sheep for the South-East, said that owing to the recent development of the country in the South-East through the drainage of a large area of swampy land, and the subdivision of many of the larger estates into smaller holdings, it would soon become necessary for landholders to devote their attention more to mixed farming, and particularly, where it could be done, to the growing of fodder crops for fattening purposes. The class of sheep, then, that would be the most profitable for farmers to breed was, in his opinion, the crossbred. There were three crosses particularly adapted to the conditions prevailing in the South-East, viz., Lincoln-Merino, Romney Marsh-Merino, and Leicester-Merino. Either of those crosses produced a sheep that would put a splendid quality of wool, and if required for fattening purposes, there was ample room to put on the weight. In cross breeding great care should be exercised, otherwise an improvement would be made on the one side to the detriment of the other, more especially when getting away from the first cross. The Lincoln-Merino cross had been for many years in the lower South-East, and some very fine flocks were to be seen in the district. The Lincoln breed had been introduced into the South-East by the late Dr. Brown, of Moorak, Mount Gambier, from whose flock many of the Lincoln studs of Victoria were founded. There were still a number of breeders in the Mount Gambier and Millicent districts whose sheep would compare favorably with any in the Commonwealth. The Lincolns were said to be the largest sheep known, and were favored with a hardy constitution, which was proved by the fact that they were to be found in nearly every country in the world. The wool of the first cross of the Lincoln-Merino commanded high prices, both in the home and foreign markets, while the carcass for freezing purposes was much sought after, both as lamb and mutton. The one objection to that breed was that they possessed a very strong desire to live with the "other fellow" on the opposite side of the fence. The Romney Marsh-Merino cross was not so numerous in that district as the one just referred to, but they were rapidly coming into favor, and would in a very few years occupy a foremost place in the flocks of the South-East. The Romney Marsh breed had been introduced into the district some years ago by the Messrs. Feuerherdt Brothers, of Crower, near Lucindale, who had founded a stud which had attracted much attention from breeders, not only in the Commonwealth, but also from the other side of the world. Mr. George Riddoch, of Koorine, Kalangadoo, was also turning his attention to that breed, and had some splendid animals on his property, as also had Mr. A. B. Feuerherdt, of Tarloop, Naracoorte, who, like his brothers, thought very highly of them as wool and mutton producers. Those sheep were natives of the south-eastern part of England, especially the drained marsh districts of Kent, where they had been bred from very early times. They had the reputation of being hardier than the Lincolns, and differed from all the long-wool breeds in being closer coated. The dis-

tinguishing feature was a long white head, with a peculiar tuft of wool on a broad forehead. Their especial merit was that they were immune to foot rot, and therefore should be the right type of sheep for the wet country of the South-East, as in some parts of the district that disease had given considerable trouble to the sheep farmers. The Leicester-Merino cross was almost unknown in that district, but nevertheless those to be seen at the Kybyllite Experimental Farm had much to recommend them, and the type would yet take a prominent place with the crossbred flocks of that part of the State. The Leicester breed had one characteristic, and an important one, too, that should make them especially suitable to mate with Merino ewes, and that was their fineness of bone and exceedingly small head, which would result in a higher percentage of lambs being obtained than with either of the long wool breeds mentioned. The ewes of the breeds he had mentioned were said to be splendid mothers, which was a matter of importance when the rearing of lambs for freezing purposes was contemplated. It was impossible for him to produce the sheep of each class named, but he had done the next best thing by bringing a few samples of their wool, which would speak for themselves. An old Swedish proverb said:—'Sheep have golden feet, and wherever the print of them appears the soil is turned to gold.' That saying was particularly applicable to Australia.—Mr. A. B. Feuerherdt said that he was a strong advocate of the crossbred for the country west and east of Naracoorte. The Romney Marsh cross was very suitable for the wet lands, because they were not subject to foot rot, which gave much trouble in the South-East in the case of Merinos and other breeds. In crossbreeding it was a mistake to breed from a clean wool ram with a crossbred ewe. It would be better to cross the ewe with an open-woolled ram, after the style of the northern sheep. He might mention that the Romney Marsh thrived well on the coast land of Queensland, where the Merino did not thrive. Mr. Caldwell said they could not shut their eyes to the fact that Merino sheep were still the sheep most forward in the South-East, and he should take it from that that the Merino was the best suited for the greater portion of the district, which did not produce strong feed, and therefore he thought that the Merino was best adapted for it generally. The question, after all, was what paid the best on the average of the country. He recognised that Mr. Rogers advocated the ewes principally for breeding lambs for export; but that industry required very rich country, or else the raising of fodder for the sheep, and in that the question of whether it would pay entered. With the exception of some choice portions of the South-East lamb-raising was still in the future, and so far the Merino, generally speaking, had proved the best sheep for the South-East. Mr. Feuerherdt said the Merino would never be eliminated from the South-East, and it was highly necessary for cross breeding; but there were certain kinds of land, and a considerable extent of it in the South-East, which was better suited for the cross. They could work the different crosses with the Merino. He might mention, as an instance of the importance of salt to sheep, that at one time Spain decided that no salt should leave the country, and one ton of salt was allowed for every 1,000 sheep. In reply to questions, Mr. Feuerherdt said that the tendency of the Romney Marsh cross was to eliminate foot rot. The Romney Marsh was healthy at birth, and was early maturing. Mr. S. H. Shinckel said that he had found crosses a great deal of trouble, and liked sheep he could keep in his paddock. He agreed that a great deal of the South-East country was better adapted for the Merino, and there was other country adapted for the crossbred and lamb-raising. He believed the crossbreds in time would become more numerous, but they would never dispense with the Merinos in that district.

NARACOORTE, December 9th.—The Director of Agriculture (Professor A. J. Perkins) attended the meeting by invitation, and was accorded a hearty welcome by the Chairman. After replying to a number of questions which were submitted, Professor Perkins, in acknowledging a vote of thanks, said that he recognised there was much work to be done in the district, and he would visit it as often as he could in order to familiarise himself with the conditions.